Phobos

The Phobos Contributors

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PROJECT INFO

This page lists general info that should be known about the project.

ONE

BUILD TYPES

There are three main types of Phobos builds:

- *stable builds* - those are numbered like your regular versions (something close to semantic versioning, e.g. version 1.2.3 for example) and ideally should contain no bugs, therefore are safe to use in mods;

- *development builds* - those are the builds which contain functionality that needs to be tested. They are numbered plainly starting from 0 and incrementing the number on each release. Mod authors still can include those versions with their mods if they want latest features, though we can't guarantee lack of bugs;

- *nightly builds* - bleeding edge versions which can include prototypes, proofs of concepts, scrapped features etc., in other words - we can't guarantee anything in those builds and they absolutely should NOT be used in mod releases and should only be used to help with development and testing.

1.1 Disabling development build warning

DISCLAIMER: We understand that everyone wants to try and use the new features as soon as they're released, but we can't do all the testing ourselves, so we only test the functionality on a basic level. We ask everyone who uses the new development build first to **test the new changes in every possible way first before disabling the development build warning** and proceeding to include the build in your mod release. This would allow us to concentrate on implementing the actual features, which is the most complex task. Learn more on testing *here*.

You can hide the warning by specifying the build number after `-b=` as a command line argument (for example, `-b=1` would hide the warning for development build #1 of Phobos).

TWO

SAVED GAMES FILTERING

Phobos fully supports saving and loading thanks to prototype code from publicly released Ares 0.A source and it implements it's own filtering which shouldn't conflict with Ares save filtering. Save games between different versions are incompatible due to changes to Phobos extension classes which are present in almost every build release. The filtering mechanism, hovewer, doesn't apply to nightly versions - those use latest development build number on which this nightly is based on. While different nightly version saves may be listed, they are most likely incompatible in case there were changes to extension class fields.

COMPATIBILITY

While Phobos is standalone, it is designed to be used alongside Ares and CnCNet5 spawner. Adding new features or improving existing ones is done with compatibility with those in mind.

While we would also like to support HAres we can't guarantee compatibility with it due to the separation of it's userbase and developers from international community. We welcome any help on the matter though!

WHAT'S NEW

This page lists the history of changes across stable Phobos releases and also all the stuff that requires modders to change something in their mods to accomodate.

4.1 Migrating

Hint: You can use the migration utility (can be found on Phobos supplementaries repo) to apply most of the changes automatically using a corresponding sed script file.

4.1.1 From vanilla

- SHP debris hardcoded shadows now respect `Shadow=no` tag value, and due to it being the default value they wouldn't have hardcoded shadows anymore by default. Override this by specifying `Shadow=yes` for SHP debris.

- Translucent RLE SHPs will now be drawn using a more precise and performant algorithm that has no green tint and banding. Can be disabled with `rulesmd.ini->[General]->FixTransparencyBlitters=no`.

- Iron Curtain status is now preserved by default when converting between TechnoTypes via `DeploysInto/UndeploysInto`. This behavior can be turned off per-TechnoType and global basis using `[SOMETECHNOTYPE]/[CombatDamage]->IronCurtain.KeptOnDeploy=no`.

4.1.2 From older Phobos versions

From pre-0.3 devbuilds

- `Trajectory.Speed` is now defined on projectile instead of weapon.

- `Gravity=0` is not supported anymore as it will cause the projectile to fly backwards and be unable to hit the target which is not at the same height. Use `Straight` Trajectory instead. See *here*.

- Automatic self-destruction logic logic has been reimplemented, `Death.NoAmmo`, `Death.Countdown` and `Death.Peaceful` tags have been remade/renamed and require adjustments to function.

- `DetachedFromOwner` on weapons is deprecated. This has been replaced by `AllowDamageOnSelf` on warheads.

- Timed jump script actions now take the time measured in ingame seconds instead of frames. Divide your value by 15 to accomodate to this change.

- *Placement Preview* logic has been adjusted, `BuildingPlacementPreview.DefaultTranslucentLevel`, `BuildingPlacementGrid.TranslucentLevel`, `PlacementPreview.Show`, `PlacementPreview.TranslucentLevel` and `ShowBuildingPlacementPreview` tags have been remade/renamed and require adjustments to function. In addition, you must explicitly enable this feature by specifying `[AudioVisual]->PlacementPreview=yes`.

- Existing script actions were renumbered, please use the migration utility to change the numbers to the correct ones.

- `DiskLaser.Radius` values were misinterpreted by a factor of 1/2. The default radius is now 240, please multiply your customized radii by 2.

From 0.2.2.2

- Keys `rulesmd.ini->[SOMEWARHEAD]->PenetratesShield` and `rulesmd.ini->[SOMEWARHEAD]->BreaksShield` have been changed to `Shield.Penetrate` and `Shield.Break`, respectively.

- `Rad.NoOwner` on weapons is deprecated. This has been replaced by `RadHasOwner` key on radiation types itself. It also defaults to no, so radiation once again has no owner house by default.

- `RadApplicationDelay` and `RadApplicationDelay.Building` on custom radiation types are now only used if `[Radiation] -> UseGlobalRadApplicationDelay` is explicitly set to false, otherwise values from `[Radiation]` are used.

- Existing script actions were renumbered, please use the migration utility to change the numbers to the correct ones.

From 0.1.1

- Key `rulesmd.ini->[SOMETECHNOTYPE]->Deployed.RememberTarget` is deprecated and can be removed now, the bugfix for `DeployToFire` deployers is now always on.

4.1.3 For Map Editor (Final Alert 2)

In `FAData.ini`:

```
[ParamTypes]
47=Structures,28
53=Play BuildUp,10
54=Use GlobalVar,10
55=Operation,0
56=Variable index,0
57=Lower bound,0
58=Upper bound,0
59=Operate var is global,10
60=Operate var index,0

[EventsRA2]
500=Local variable is greater than,48,6,0,0,[LONG DESC],0,1,500,1
501=Local variable is less than,48,6,0,0,[LONG DESC],0,1,501,1
502=Local variable equals to,48,6,0,0,[LONG DESC],0,1,502,1
503=Local variable is greater than or equals to,48,6,0,0,[LONG DESC],0,1,503,1
504=Local variable is less than or equals,48,6,0,0,[LONG DESC],0,1,504,1
```

(continues on next page)

```
505=Local variable and X is true,48,6,0,0,[LONG DESC],0,1,505,1
506=Global variable is greater than,48,6,0,0,[LONG DESC],0,1,506,1
507=Global variable is less than,48,6,0,0,[LONG DESC],0,1,507,1
508=Global variable equals to,48,6,0,0,[LONG DESC],0,1,508,1
509=Global variable is greater than or queals to,48,6,0,0,[LONG DESC],0,1,509,1
510=Global variable is less than or equals to,48,6,0,0,[LONG DESC],0,1,510,1
511=Global variable and X is true,48,6,0,0,[LONG DESC],0,1,511,1
512=Local variable is greater than local variable,48,3,0,0,[LONG DESC],0,1,500,1
513=Local variable is less than local variable,48,3,0,0,[LONG DESC],0,1,501,1
514=Local variable equals to local variable,48,3,0,0,[LONG DESC],0,1,502,1
515=Local variable is greater than or equals to local variable,48,3,0,0,[LONG DESC],0,1,
→503,1
516=Local variable is less than or equals local variable,48,3,0,0,[LONG DESC],0,1,504,1
517=Local variable and local variable is true,48,3,0,0,[LONG DESC],0,1,505,1
518=Global variable is greater than local variable,48,3,0,0,[LONG DESC],0,1,506,1
519=Global variable is less than local variable,48,3,0,0,[LONG DESC],0,1,507,1
520=Global variable equals to local variable,48,3,0,0,[LONG DESC],0,1,508,1
521=Global variable is greater than or queals to local variable,48,3,0,0,[LONG DESC],0,1,
→509,1
522=Global variable is less than or equals to local variable,48,3,0,0,[LONG DESC],0,1,
→510,1
523=Global variable and local variable is true,48,3,0,0,[LONG DESC],0,1,511,1
524=Local variable is greater than global variable,48,35,0,0,[LONG DESC],0,1,500,1
525=Local variable is less than global variable,48,35,0,0,[LONG DESC],0,1,501,1
526=Local variable equals to global variable,48,35,0,0,[LONG DESC],0,1,502,1
527=Local variable is greater than or equals to global variable,48,35,0,0,[LONG DESC],0,
→1,503,1
528=Local variable is less than or equals global variable,48,35,0,0,[LONG DESC],0,1,504,1
529=Local variable and global variable is true,48,35,0,0,[LONG DESC],0,1,505,1
530=Global variable is greater than global variable,48,35,0,0,[LONG DESC],0,1,506,1
531=Global variable is less than global variable,48,35,0,0,[LONG DESC],0,1,507,1
532=Global variable equals to global variable,48,35,0,0,[LONG DESC],0,1,508,1
533=Global variable is greater than or queals to global variable,48,35,0,0,[LONG DESC],0,
→1,509,1
534=Global variable is less than or equals to global variable,48,35,0,0,[LONG DESC],0,1,
→510,1
535=Global variable and global variable is true,48,35,0,0,[LONG DESC],0,1,511,1
600=Shield of the attached object is broken,0,0,0,0,[LONG DESC],0,1,600,1

[ActionsRA2]
125=Build at...,-10,47,53,0,0,0,1,0,0,[LONG DESC],0,1,125
500=Save game,-4,13,0,0,0,0,0,0,0,[LONG DESC],0,1,500,1
501=Edit variable,0,56,55,6,54,0,0,0,0,[LONG DESC],0,1,501,1
502=Generate random number,0,56,57,58,54,0,0,0,0,[LONG DESC],0,1,502,1
503=Print variable value,0,56,54,0,0,0,0,0,0,[LONG DESC],0,1,503,0
504=Binary operation,0,56,55,60,54,59,0,0,0,[LONG DESC],0,1,504,1
505=Fire Super Weapon at specified location (Phobos),0,0,20,2,21,22,0,0,0,Launch a Super␣
→Weapon from [SuperWeaponTypes] list at a specified location. House=-1 means random␣
→target that isn't neutral. House=-2 means the first neutral house. House=-3 means␣
→random human target. Coordinate X=-1 means random. Coordinate Y=-1 means random,0,1,505
506=Fire Super Weapon at specified waypoint (Phobos),0,0,20,2,30,0,0,0,0,Launch a Super␣
→Weapon from [SuperWeaponTypes] list at a specified waypoint. House=-1 means random␣
→target that isn't neutral. House=-2 means the first neutral house. House=-3 means␣
→random human target. Coordinate X=-1 means random. Coordinate Y=-1 means random,0,1,506
```

```
; FOLLOWING ENTRIES REQUIRE FA2SP.DLL (by secsome)
[ScriptTypeLists]
1=ScriptLocalVariable
2=ScriptGlobalVariable
3=ScriptLocalVariable_Local
4=ScriptLocalVariable_Global
5=ScriptGlobalVariable_Local
6=ScriptGlobalVariable_Global

[ScriptLocalVariable]
HasExtraParam=Yes
BuiltInType=14

[ScriptGlobalVariable]
HasExtraParam=Yes
BuiltInType=5

[ScriptLocalVariable_Local]
HasExtraParam=Yes
ExtraParamType=ScriptExtType_LocalVariables
BuiltInType=14

[ScriptLocalVariable_Global]
HasExtraParam=Yes
ExtraParamType=ScriptExtType_GlobalVariables
BuiltInType=14

[ScriptGlobalVariable_Local]
HasExtraParam=Yes
ExtraParamType=ScriptExtType_LocalVariables
BuiltInType=5

[ScriptGlobalVariable_Global]
HasExtraParam=Yes
ExtraParamType=ScriptExtType_GlobalVariables
BuiltInType=5

[ScriptExtType_LocalVariables]
BuiltInType=14

[ScriptExtType_GlobalVariables]
BuiltInType=5

[ScriptsRA2]
10100=Timed Area Guard,20,0,1,[LONG DESC]
10103=Load Onto Transports,0,0,1,[LONG DESC]
10101=Wait until ammo is full,0,0,1,[LONG DESC]
18000=Local variable set,22,0,1,[LONG DESC]
18001=Local variable add,22,0,1,[LONG DESC]
18002=Local variable minus,22,0,1,[LONG DESC]
18003=Local variable multiply,22,0,1,[LONG DESC]
```

```
18004=Local variable divide,22,0,1,[LONG DESC]
18005=Local variable mod,22,0,1,[LONG DESC]
18006=Local variable leftshift,22,0,1,[LONG DESC]
18007=Local variable rightshift,22,0,1,[LONG DESC]
18008=Local variable reverse,22,0,1,[LONG DESC]
18009=Local variable xor,22,0,1,[LONG DESC]
18010=Local variable or,22,0,1,[LONG DESC]
18011=Local variable and,22,0,1,[LONG DESC]
18012=Global variable set,23,0,1,[LONG DESC]
18013=Global variable add,23,0,1,[LONG DESC]
18014=Global variable minus,23,0,1,[LONG DESC]
18015=Global variable multiply,23,0,1,[LONG DESC]
18016=Global variable divide,23,0,1,[LONG DESC]
18017=Global variable mod,23,0,1,[LONG DESC]
18018=Global variable leftshift,23,0,1,[LONG DESC]
18019=Global variable rightshift,23,0,1,[LONG DESC]
18020=Global variable reverse,23,0,1,[LONG DESC]
18021=Global variable xor,23,0,1,[LONG DESC]
18022=Global variable or,23,0,1,[LONG DESC]
18023=Global variable and,23,0,1,[LONG DESC]
18024=Local variable set by local variable,24,0,1,[LONG DESC]
18025=Local variable add by local variable,24,0,1,[LONG DESC]
18026=Local variable minus by local variable,24,0,1,[LONG DESC]
18027=Local variable multiply by local variable,24,0,1,[LONG DESC]
18028=Local variable divide by local variable,24,0,1,[LONG DESC]
18029=Local variable mod by local variable,24,0,1,[LONG DESC]
18030=Local variable leftshift by local variable,24,0,1,[LONG DESC]
18031=Local variable rightshift by local variable,24,0,1,[LONG DESC]
18032=Local variable reverse by local variable,24,0,1,[LONG DESC]
18033=Local variable xor by local variable,24,0,1,[LONG DESC]
18034=Local variable or by local variable,24,0,1,[LONG DESC]
18035=Local variable and by local variable,24,0,1,[LONG DESC]
18036=Global variable set by local variable,25,0,1,[LONG DESC]
18037=Global variable add by local variable,25,0,1,[LONG DESC]
18038=Global variable minus by local variable,25,0,1,[LONG DESC]
18039=Global variable multiply by local variable,25,0,1,[LONG DESC]
18040=Global variable divide by local variable,25,0,1,[LONG DESC]
18041=Global variable mod by local variable,25,0,1,[LONG DESC]
18042=Global variable leftshift by local variable,25,0,1,[LONG DESC]
18043=Global variable rightshift by local variable,25,0,1,[LONG DESC]
18044=Global variable reverse by local variable,25,0,1,[LONG DESC]
18045=Global variable xor by local variable,25,0,1,[LONG DESC]
18046=Global variable or by local variable,25,0,1,[LONG DESC]
18047=Global variable and by local variable,25,0,1,[LONG DESC]
18048=Local variable set by global variable,26,0,1,[LONG DESC]
18049=Local variable add by global variable,26,0,1,[LONG DESC]
18050=Local variable minus by global variable,26,0,1,[LONG DESC]
18051=Local variable multiply by global variable,26,0,1,[LONG DESC]
18052=Local variable divide by global variable,26,0,1,[LONG DESC]
18053=Local variable mod by global variable,26,0,1,[LONG DESC]
18054=Local variable leftshift by global variable,26,0,1,[LONG DESC]
18055=Local variable rightshift by global variable,26,0,1,[LONG DESC]
```

```
18056=Local variable reverse by global variable,26,0,1,[LONG DESC]
18057=Local variable xor by global variable,26,0,1,[LONG DESC]
18058=Local variable or by global variable,26,0,1,[LONG DESC]
18059=Local variable and by global variable,26,0,1,[LONG DESC]
18060=Global variable set by global variable,27,0,1,[LONG DESC]
18061=Global variable add by global variable,27,0,1,[LONG DESC]
18062=Global variable minus by global variable,27,0,1,[LONG DESC]
18063=Global variable multiply by global variable,27,0,1,[LONG DESC]
18064=Global variable divide by global variable,27,0,1,[LONG DESC]
18065=Global variable mod by global variable,27,0,1,[LONG DESC]
18066=Global variable leftshift by global variable,27,0,1,[LONG DESC]
18067=Global variable rightshift by global variable,27,0,1,[LONG DESC]
18068=Global variable reverse by global variable,27,0,1,[LONG DESC]
18069=Global variable xor by global variable,27,0,1,[LONG DESC]
18070=Global variable or by global variable,27,0,1,[LONG DESC]
18071=Global variable and by global variable,27,0,1,[LONG DESC]

[ScriptParams]
22=Local variables,-1
23=Global variables,-2
24=Local variables,-3
25=Local variables,-4
26=Global variables,-5
27=Global variables,-6
```

4.2 Changelog

4.2.1 0.3

New:

- LaserTrails initial implementation (by Kerbiter, ChrisLv_CN)

- Anim-to-Unit logic and ability to randomize DestroyAnim (by Otamaa)

- Shield modification warheads (by Starkku)

- Shield BreakWeapon & InitialStrength (by Starkku)

- Initial Strength for TechnoTypes (by Uranusian)

- Re-enable obsolete `JumpjetControls` for TechnoTypes' default Jumpjet properties (by Uranusian)

- Weapon targeting filter (by Uranusian, Starkku)

- Secondary weapon fallback customization (by Starkku)

- Burst-specific FLHs for TechnoTypes (by Starkku)

- Burst delays for weapons (by Starkku)

- AreaFire weapon target customization (by Starkku)

- Auto-firing TechnoType weapons (by Starkku)

- PowerPlant Enhancer (by secsome)

- Unlimited Global / Local Variables (by secsome)

- Adds a "Load Game" button to the retry dialog on mission failure (by secsome)

- Default disguise for individual InfantryTypes (by secsome)

- Quicksave hotkey command (by secsome)

- Save Game trigger action (by secsome)

- Numeric Variables (by secsome)

- TechnoType's tooltip would display it's build time now (by secsome)

- Customizable tooltip background color and opacity (by secsome)

- FrameByFrame & FrameStep hotkey command (by secsome)

- Allow `NotHuman=yes` infantry to use random `Death` anim sequence (by Otamaa)

- Ability for warheads to trigger specific `NotHuman=yes` infantry `Death` anim sequence (by Otamaa)

- XDrawOffset for animations (by Morton)

- Customizable OpenTopped properties (by Otamaa)

- Automatic Passenger Deletion (by FS-21)

- Script actions for new AI attacks (by FS-21)

- Script actions for modifying AI Trigger Current Weight (by FS-21)

- Script action for waiting & repeat the same new AI attack if no target was found (by FS-21)

- Script action that modifies the Team's Trigger Weight when ends the new attack action (by FS-21)

- Script action for picking a random script from a list (by FS-21)

- Script action for new AI movements towards certain objects (by FS-21)

- Script action that modify target distance in the new move actions (by FS-21)

- Script action that modify how ends the new move actions (by FS-21)

- Script action that un-register Team success (by FS-21)

- Script action to regroup temporarily around the Team Leader (by FS-21)

- Script action to randomly skip next action (by FS-21)

- Script action for timed script action jumps (by FS-21)

- ObjectInfo now shows current Target and AI Trigger data (by FS-21)

- Shield absorption and passthrough customization (by Morton)

- Limbo Delivery of buildings (by Morton)

- Ore stage threshold for `HideIfNoOre` (by Otamaa)

- Image reading in art rules for all TechnoTypes (by Morton)

- Attached animation layer customization (by Starkku)

- Jumpjet unit layer deviation customization (by Starkku)

- IsSimpleDeployer deploy direction & animation customizations (by Starkku)

- Customizable projectile gravity (by secsome)

- Gates can now link with walls correctly via `NSGates` or `EWGates` (by Uranusian)

- Per-warhead toggle for decloak of damaged targets (by Starkku)

- `DeployFireWeapon=-1` now allows the deployed infantries using both weapons as undeployed (by Uranusian)

- Power delta (surplus) counter for sidebar (by Morton)

- Added Production and Money to Dump Object Info command (by FS-21)

- `EnemyUIName=` Now also works for other TechnoTypes (by Otamaa)

- `DestroyAnim` & `DestroySound` for TerrainTypes (by Otamaa)

- Weapons fired on warping in / out (by Starkku)

- `Storage.TiberiumIndex` for customizing resource storage in structures (by FS-21)

- Grinder improvements & customizations (by Starkku)

- Attached animation position customization (by Starkku)

- Trigger Action 505 for Firing SW at specified location (by FS-21)

- Trigger Action 506 for Firing SW at waypoint (by FS-21)

- New behaviors for objects' self-destruction under certain conditions (by Trsdy & FS-21)

- Slaves' ownership decision when corresponding slave miner is destroyed (by Trsdy)

- Customize buildings' selling sound and EVA voice (by Trsdy)

- `ForceWeapon.Naval.Decloacked` for overriding uncloaked underwater attack behavior (by FS-21)

- Shrapnel enhancement (by secsome)

- Shared Ammo for transports to passengers (by FS-21)

- Additional critical hit logic customizations (by Starkku)

- Laser trails for VoxelAnims (by Otamaa)

- Local warhead screen shaking (by Starkku)

- Feedback weapon (by Starkku)

- TerrainType & ore minimap color customization (by Starkku)

- Single-color weapon lasers (by Starkku)

- Customizable projectile trajectory (by secsome)

- Display damage numbers debug hotkey command (by Starkku)

- Toggleable display of TransactMoney amounts (by Starkku)

- Building-provided self-healing customization (by Starkku)

- Building placement preview (by Otamaa & Belonit)

- Passable & buildable-upon TerrainTypes (by Starkku)

- Toggle for passengers to automatically change owner if transport owner changes (by Starkku)

- Superweapon launch on warhead detonation (by Trsdy)

- Preserve IronCurtain status upon DeploysInto/UndeploysInto (by Trsdy)

- Correct owner house for Warhead Anim/SplashList & Play Animation trigger animations (by Starkku)

- Customizable FLH When Infantry Is Crouched Or Deployed (by FS-21)

- Enhanced projectile interception logic, including projectile strength & armor types (by Starkku)

- Initial Strength for Cloned Infantry (by FS-21)

- OpenTopped transport rangefinding & deactivated state customizations (by Starkku)

- Forbidding parallel AI queues by type (by NetsuNegi & Trsdy)

- Animation damage / weapon improvements (by Starkku)

- Warhead self-damaging toggle (by Starkku)

- Trailer animations inheriting owner (by Starkku)

- Warhead detonation on all objects on map (by Starkku)

- Implemented support for PCX images for campaign loading screen (by FlyStar)

- Implemented support for PCX images for observer loading screen (by Uranusian)

- Animated (non-tiberium spawning) TerrainTypes (by Starkku)

- Toggleable passenger killing for Explodes=true units (by Starkku)

Vanilla fixes:

- Fixed laser drawing code to allow for thicker lasers in house color draw mode (by Kerbiter, ChrisLv_CN)

- Fixed DeathWeapon not detonating properly (by Uranusian)

- Fixed lasers & other effects drawing from wrong offset with weapons that use Burst (by Starkku)

- Fixed buildings with `Naval=yes` ignoring `WaterBound=no` to be forced to place onto water (by Uranusian)

- Fixed temporal weapon crash under certain conditions where stack dump starts with 0051BB7D (by secsome)

- Fixed the bug when retinting map lighting with a map action corrupted light sources (by secsome)

- Fixed the bug when reading a map which puts `Preview(Pack)` after `Map` lead to the game fail to draw the preview (by secsome)

- Fixed the bug that GameModeOptions are not correctly saved (by secsome)

- Fixed the bug that AITriggerTypes do not recognize building upgrades (by Uranusian)

- Fixed AI Aircraft docks bug when Ares tag `[GlobalControls]` > `AllowParallelAIQueues=no` is set (by FS-21)

- Fixed the bug when occupied building's `MuzzleFlashX` is drawn on the center of the building when `X` goes past 10 (by Otamaa)

- Fixed jumpjet units that are `Crashable` not crashing to ground properly if destroyed while being pulled by a `Locomotor` warhead (by Starkku)

- Fixed aircraft & jumpjet units not being affected by speed modifiers (by Starkku)

- Fixed vehicles (both voxel & SHP) to fully respect `Palette` (by Starkku)

- Fixed mind control indicator animations not reappearing on mind controlled objects that are cloaked and then uncloaked (by Starkku)

- Fixed Nuke carrier and payload weapons not respecting `Bright` setting on weapon (by Starkku)

- Fixed buildings not reverting to undamaged graphics when HP was restored above `[AudioVisual]-`>`ConditionYellow` via `SelfHealing` (by Starkku)

- Fixed jumpjet units being unable to turn to the target when firing from a different direction (by Trsdy)

- Fixed turreted jumpjet units always facing bottom-right direction when stop moving (by Trsdy)

- Fixed jumpjet objects being unable to detect cloaked objects beneath (by Trsdy)

- Anim owner is now set for warhead AnimList/SplashList anims and Play Anim at Waypoint trigger animations (by Starkku)

- Fixed AI script action Deploy getting stuck with vehicles with `DeploysInto` if there was no space to deploy at initial location (by Starkku)

- Fixed `Foundation=0x0` causing crashes if used on TerrainTypes.

- Projectiles now remember the house of the firer even if the firer is destroyed before the projectile detonates. Does not currently apply to Ares-introduced Warhead effects (by Starkku)

- Buildings now correctly use laser parameters set for Secondary weapons instead of reading them from Primary weapon (by Starkku)

- Fixed an issue that caused vehicles killed by damage dealt by a known house but without a known source TechnoType (f.ex animation warhead damage) to not be recorded as killed correctly and thus not spring map trigger events etc. (by Starkku)

- Translucent RLE SHPs will now be drawn using a more precise and performant algorithm that has no green tint and banding (only applies to Z-aware drawing mode for now) (by Apollo)

- Fixed transports recursively put into each other not having a correct killer set after second transport when being killed by something (by Kerbiter)

- Fixed projectiles with `Inviso=true` suffering from potential inaccuracy problems if combined with `Airburst=yes` or Warhead with `EMEffect=true` (by Starkku)

- Fixed the bug when `MakeInfantry` logic on BombClass resulted in `Neutral` side infantry (by Otamaa)

- Fixed railgun particles being drawn to wrong coordinate against buildings with non-default `TargetCoordOffset` or when force-firing on bridges (by Starkku)

- Fixed building `TargetCoordOffset` not being taken into accord for several things like fire angle calculations and target lines (by Starkku)

- Allowed observers to see a selected building's radial indicator (by Trsdy)

Phobos fixes:

- Fixed shields being able to take damage when the parent TechnoType was under effects of a `Temporal` Warhead (by Starkku)

- Improved shield behavior for forced damage (by Uranusian)

- Fixed SplashList animations playing when a unit is hit on a bridge over water (by Uranusian)

- Fixed shielded objects not decloaking if shield takes damage (by Starkku)

- Fixed critical hit animation playing even if no critical hits were dealt due to `Crit.Affects` or `ImmuneToCrit` settings (by Starkku)

- Fixed `RemoveDisguise` not working on `PermaDisguise` infantry (by Starkku)

- Fixed single-color laser (IsHouseColor, IsSingleColor, LaserTrails) glow falloff to match the vanilla appearance (by Starkku)

- Fixed a potential cause of crashes concerning shield animations (such in conjunction with cloaking) (by Starkku)

- Fixed interceptors intercepting projectiles fired by friendly objects if the said object died after firing the projectile (by Starkku)

- Fixed interceptor weapons with `Inviso=true` projectiles detonating the projectile at wrong coordinates (by Starkku)

- Fixed some possible configuration reading issues when using Phobos with patches that rename `uimd.ini` (by Belonit)

- Fixed a game crash when using the Map Snapshot command (by Otamaa)

- Fixed issue with incorrect input in edit dialog element when using IME (by Belonit)

- Fixed an issue where tooltip text could be clipped by tooltip rectangle border if using `MaxWidth` > 0 (by Starkku)

- Fixed projectiles with `Trajectory=Straight` suffering from potential inaccuracy problems if combined with `Airburst=yes` or Warhead with `EMEffect=true` (by Starkku)

- Minor performance optimization related to shields (by Trsdy)

- Fixed teleporting miners (Chrono Miner) considered to be idle by harvester counter, improved related game performance (by Trsdy)

- Fixed negative damage weapons considering shield health when evaluating targets even if Warhead had `Shield.Penetrate` set to true (by Starkku)

- Fixed engineers considering shield health instead of building health when determining if they can repair or capture a building (by Starkku)

- Fixed shield animations (`IdleAnim`, `BreakAnim` and `HitAnim`) showing up even if the object shield is attached to is currently underground (by Starkku)

- Fixed shields not being removed from sinking units until they have fully finished sinking (by Starkku)

- Fixed Phobos Warhead effects (crits, new shield modifiers etc.) considering sinking units valid targets (by Starkku)

- Fixed an issue where `FireOnce=yes` deploy weapons on vehicles would still fire multiple times if deploy command is issued repeatedly or when not idle (by Starkku)

- Fixed techno-extdata update after type conversion (by Trsdy)

- Fixed a game crash when checking BuildLimit if Phobos is running without Ares (by Belonit)

- Corrected the misinterpretation in the definition of `DiskLaser.Radius` (by Trsdy)

Non-DLL:

- Implemented a tool (sed wrapper) to semi-automatically upgrade INIs to use latest Phobos tags (by Kerbiter)

4.2.2 0.2.2.2

Phobos fixes:

- Fixed shield type info not saving properly (by Uranusian)

- Fixed extended building upgrades logic not properly interacting with Ares' BuildLimit check (by Uranusian)

- Fix more random crashes for Cameo Priority (by Uranusian)

- Fix aircraft weapons causing game freeze when burst index was not correctly reset after firing (by Starkku)

4.2.3 0.2.2.1

Phobos fixes:

- Fixed random crashes about CameoPriority (by Uranusian)

- Fixed trigger action 125 not functioning properly (by Uranusian)

- Fixed area warhead detonation not falling back to firer house (by Otamaa)

- RadSite hook adjustment for `FootClass` to support Ares `RadImmune`; also various fixes to radiation / desolators (by Otamaa)

- Fixed `Crit.Affects` not functioning properly (by Uranusian)

- Fixed improper upgrade owner transfer which resulted in built ally / enemy building upgrades keeping the player who built them alive (by Kerbiter)

4.2.4 0.2.2

New:

- Customizable producing progress "bars" like CnC:Remastered did (by Uranusian)

- Customizable cameo sorting priority (by Uranusian)

- Customizable harvester ore gathering animation (by secsome, Uranusian)

- Allow making technos unable to be issued with movement order (by Uranusian)

Vanilla fixes:

- Fixed non-IME keyboard input to be working correctly for languages / keyboard layouts that use character ranges other than Basic Latin and Latin-1 Supplement (by Belonit)

Phobos fixes:

- Fixed the critical damage logic not functioning properly (by Uranusian)

- Fixed the bug when executing the stop command game crashes (by Uranusian)

4.2.5 0.2.1.1

Phobos fixes:

- Fixed occasional crashes introduced by `Speed=0` stationary vehicles code (by Starkku)

4.2.6 0.2.1

New:

- Setting VehicleType `Speed` to 0 now makes game treat them as stationary (by Starkku)

Vanilla fixes:

- Fixed the bug when after a failed placement the building/defence tab hotkeys won't trigger placement mode again (by Uranusian)

- Fixed the bug when building with `UndeployInto` plays `EVA_NewRallypointEstablished` while undeploying (by secsome)

Phobos fixes:

- Fixed the bug when trigger action `125 Build At...` wasn't actually producing a building when the target cells were occupied (by secsome)

4.2.7 0.2

New:

- Shield logic for TechnoTypes (by Uranusian, secsome, Belonit) with warhead additions (by Starkku)
- Custom Radiation Types (by AlexB, Otamaa, Belonit, Uranusian)
- New ScriptType actions `71 Timed Area Guard`, `72 Load Onto Transports`, `73 Wait until ammo is full` (by FS-21)
- Ore drills now have customizable ore type, range, ore growth stage and amount of cells generated (by Kerbiter)
- Basic projectile interception logic (by AutoGavy, ChrisLv_CN, Kerbiter, Erzoid/SukaHati)
- Customizable harvester active/total counter next to credits counter (by Uranusian)
- Select Next Idle Harvester hotkey command (by Kerbiter)
- Dump Object Info hotkey command (by secsome, FS-21)
- Remove Disguise and Remove Mind Control warhead effects (by secsome)
- Custom per-warhead SplashLists (by Uranusian)
- `AnimList.PickRandom` used to randomize `AnimList` with no side effects (by secsome)
- Chance-based critical damage system on warheads (by AutoGavy)
- Optional mind control range limit (by Uranusian)
- Multiple mind controllers can now release units on overload (by Uranusian, secsome)
- Spawns now can be killed on low power and have limited pursuing range (by FS-21)
- Spawns can now have the same exp. level as owner techno (by Uranusian)
- `TurretOffset` now accepts `F,L,H` and `F,L` values instead of just `F` value (by Kerbiter)
- ElectricBolt arc visuals can now be disabled per-arc (by Otamaa)
- Semantic locomotor aliases for modder convenience (by Belonit)
- Ability to specify amount of shots for strafing aircraft and burst simulation (by Starkku)
- Customizeable Teleport/Chrono Locomotor properties per TechnoType (by Otamaa)
- Maximum waypoints amount increased from 702 to 2147483647 (by secsome)
- Customizeable Missing Cameo file (by Uranusian)

Vanilla fixes:

- Map previews with zero size won't crash the game anymore (by Kerbiter, Belonit)
- Tileset 255+ bridge fix (by E1 Elite)
- Fixed fatal errors when `Blowfish.dll` couldn't be registered in the system properly due to missing admin rights (by Belonit)
- Fix to take Burst into account for aircraft weapon shots beyond the first one (by Starkku)
- Fixed the bug when units are already dead but still in map (for sinking, crashing, dying animation, etc.), they could die again (by Uranusian)

- Fixed the bug when cloaked Desolator was unable to fire his deploy weapon (by Otamaa)

- Fixed the bug when `InfiniteMindControl` with `Damage=1` will auto-release the victim to control new one (by Uranusian)

- Fixed the bug that script action `Move to cell` was still using leftover cell calculations from previous games (by secsome)

- Fixed the bug when trigger action `125 Build At...` didn't play buildup anim (by secsome)

- Fixed `DebrisMaximums` (spawned debris type amounts cannot go beyond specified maximums anymore) (by Otamaa)

- Fixes to `DeployFire` logic (`DeployFireWeapon`, `FireOnce`, stop command now work properly) (by Starkku)

Phobos fixes:

- Properly rewritten a fix for mind-controlled vehicles deploying into buildings (by FS-21)

- Properly rewritten `DeployToFire` fix, tag `Deployed.RememberTarget` is deprecated, now always on (by Kerbiter)

- New warheads now work with Ares' `GenericWarhead` superweapon (by Belonit)

4.2.8 0.1.1

Phobos fixes:

- Fixed an occasional crash when selecting units with a selection box

4.2.9 0.1

New:

- Full-color PCX graphics support (by Belonit)

- Support for PCX loading screens of any size (by Belonit)

- Extended sidebar tooltips with descriptions, recharge time and power consumption/generation (by Kerbiter, Belonit)

- Selection priority filtering for box selection (by Kerbiter)

- Shroud, reveal and money transact warheads (by Belonit)

- Custom game icon command line arg (by Belonit)

- Ability to disable black spawn position dots on map preview (by Belonit)

- Ability to specify applicable building owner for building upgrades (by Kerbiter)

- Customizable disk laser radius (by Belonit, Kerbiter)

- Ability to switch to GDI sidebar layout for any side (by Belonit)

Vanilla fixes:

- Deploying mind-controlled TechnoTypes won't make them permanently mind-controlled anymore (unfinished fix by DCoder)

- SHP debris hardcoded shadows now respect `Shadow=no` tag value (by Kerbiter)

- `DeployToFire` vehicles won't lose target on deploy anymore (unfinished fix by DCoder)

- Fixed QWER hotkey tab switching not hiding the displayed tooltip as it should (by Belonit)

- Sidebar tooltips now can go over sidebar bounds (by Belonit)

- Lifted stupidly small limit for tooltip character amount (by Belonit)

CONTRIBUTING

This page describes ways to help or contribute to Phobos and lists the contributing guidelines that are used in the project.

5.1 Guidelines for contributors

5.1.1 Project structure

Assuming you've successfully cloned and built the project before getting here, you should end up with the following project structure:

- `src/` - all the project's source code resides here.
    - `Commands/` - source code for new hotkey commands. Every command is a new class that inherits from `PhobosCommandClass` (defined in `Commands.h`) and is defined in a separate file with a few methods and then registered in `Commands.cpp`.
    - `New/` - source code for new ingame classes.
        * `Type/` - new enumerated types (types that are declared with a list section in an INI, for example, radiation types) implemented in the project. Every enumerated type class inherits `Enumerable<T>` (where `T` is an enum. type class) class that is defined in `Enumerable.h`.
        * `Entity/` - classes that represent ingame entities are located here.
    - `Ext/` - source code for vanilla engine class extensions. Each class extension is kept in a separate folder named after vanilla engine class name and contains the following:
        * `Body.h` and `Body.cpp` contain class and method definitions/declarations and common extension hooks. Each extension class must contain the following to work correctly:
            · `ExtData` - extension data class definition which inherits `Extension<T>` from `Container.h` (where `T` is the class that is being extended), which is the actual class that contains new data for vanilla classes;
            · `ExtContainer` - a definition of a special map class to store and look up `ExtData` instances for base class instances which inherits `Container<T>` from `Container.h` (where `T` is the extension data class);
            · `ExtMap` - a static instance of `ExtContainer` map;
            · constructor, destructor, serialization, deserialization and (for appropriate classes) INI reading hooks.
        * `Hooks.cpp` and `Hooks.*.cpp` contain non-common hooks to correctly patch in new custom logics.

- ExtraHeaders/ - extra header files to interact with / describe types included in game binary that are not included in YRpp yet.

- Misc/ - uncategorized source code, including hooks that don't belong to an extension class.

- Utilities/ - common code that is used across the project.

- Phobos.cpp/Phobos.h - extension bootstrapping code.

- Phobos.Ext.cpp - contains common processing code new or extended classes. If you define a new or extended class you have to add your new class into MassActions global variable type declaration in this file.

- YRpp/ - contains the header files to interact with / describe types included in game binary and also macros to write hooks using Syringe. Included as a submodule.

5.1.2 Code styleguide

We have established a couple of code style rules to keep things consistent. Some of the rules are enforced in .editorconfig, where applicable, so you can autoformat the code by pressing Ctrl + K, D hotkey chord in Visual studio. Still, it is advised to manually check the style before submitting the code.

- We use tabs instead of spaces to indent code.

- Curly braces are always to be placed on a new line. One of the reasons for this is to clearly separate the end of the code block head and body in case of multiline bodies:

```
if (SomeReallyLongCondition() ||
    ThatSplitsIntoMultipleLines())
{
    DoSomethingHere();
    DoSomethingMore();
}
```

- Braceless code block bodies should be made only when both code block head and body are single line, statements split into multiple lines and nested braceless blocks are not allowed within braceless blocks:

```
// OK
if (Something())
    DoSomething();

// OK
if (SomeReallyLongCondition() ||
    ThatSplitsIntoMultipleLines())
{
    DoSomething();
}

// OK
if (SomeCondition())
{
    if (SomeOtherCondition())
        DoSomething();
}

// OK
```

```
if (SomeCondition())
{
    return VeryLongExpression()
        || ThatSplitsIntoMultipleLines();
}
```

- Only empty curly brace blocks may be left on the same line for both opening and closing braces (if appropriate).

- If you use if-else you should either have all of the code blocks braced or braceless to keep things consistent.

- Code should have empty lines to make it easier to read. Use an empty line to split code into logical parts. It's mandatory to have empty lines to separate:

    - `return` statements (except when there is only one line of code except that statement);

    - local variable assignments that are used in the further code (you shouldn't put an empty line after one-line local variable assignments that are used only in the following code block though);

    - code blocks (braceless or not) or anything using code blocks (function or hook definitions, classes, namespaces etc.);

    - hook register input/output.

```
// OK
auto localVar = Something();
if (SomeConditionUsing(localVar))
    ...

// OK
auto localVar = Something();
auto anotherLocalVar = OtherSomething();

if (SomeConditionUsing(localVar, anotherLocalVar))
    ...

// OK
auto localVar = Something();

if (SomeConditionUsing(localVar))
    ...

if (SomeOtherConditionUsing(localVar))
    ...

localVar = OtherSomething();

// OK
if (SomeCondition())
{
    Code();
    OtherCode();

    return;
}
```

```
// OK
if (SomeCondition())
{
    SmallCode();
    return;
}
```

- `auto` may be used to hide an unnecessary type declaration if it doesn't make the code harder to read. `auto` may not be used on primitive types.

- A space must be put between braces of empty curly brace blocks.

- To have less Git merge conflicts member initializer lists and other list-like syntax structures used in frequently modified places should be split per-item with item separation characters (commas, for example) placed *after newline character*:

```
ExtData(TerrainTypeClass* OwnerObject) : Extension<TerrainTypeClass>(OwnerObject)
    , SpawnsTiberium_Type(0)
    , SpawnsTiberium_Range(1)
    , SpawnsTiberium_GrowthStage({ 3, 0 })
    , SpawnsTiberium_CellsPerAnim({ 1, 0 })
{ }
```

- Local variables and function/method args are named in the `camelCase` (using a `p` prefix to denote pointer type for every pointer nesting level) and a descriptive name, like `pTechnoType` for a local `TechnoTypeClass*` variable.

- Classes, namespaces, class fields and members are always written in `PascalCase`.

- Class fields that can be set via INI tags should be named exactly like ini tags with dots replaced with underscores.

- Pointer type declarations always have pointer sign `*` attached to the type declaration.

- Non-static class extension methods faked by declaring a static method with `pThis` as a first argument are only to be placed in the extension class for the class instance of which `pThis` is.

  - If it's crucial to fake `__thiscall` you may use `__fastcall` and use `void*` or `void* _` as a second argument to discard value passed through `EDX` register. Such methods are to be used for call replacement.

- Hooks have to be named using a following scheme: `HookedFunction_HookPurpose`, or `ClassName_HookedMethod_HookPurpose`. Defined-again hooks are exempt from this scheme due to impossibility to define different names for the same hook.

- Return addresses should use anonymous enums to make it clear what address means what, if applicable. The enum has to be placed right at the function start and include all addresses that are used in this hook:

```
DEFINE_HOOK(0x48381D, CellClass_SpreadTiberium_CellSpread, 0x6)
{
    enum { SpreadReturn = 0x4838CA, NoSpreadReturn = 0x4838B0 };

    ...
}
```

- Even if the hook doesn't use `return 0x0` to execute the overriden instructions, you still have to write correct hook size (last parameter of `DEFINE_HOOK` macro) to reduce potential issues if the person editing this hook decides to use `return 0x0`.

- New ingame "entity" classes are to be named with `Class` postfix (like `RadTypeClass`). Extension classes are to be named with `Ext` postfix instead (like `RadTypeExt`).

Note: The styleguide is not exhaustive and may be adjusted in the future.

5.1.3 Git branching model

Couple of notes regarding the Git practices. We use git-flow-like workflow:

- `master` is for stable releases, can have hotfixes pushed to it or branched off like a feature branch with the requirement of version increment and `master` being merged into `develop` after that;

- `develop` is the main development branch;

- `feature/`-prefixed branches (sometimes the prefix may be different if appropriate, like for big fixes or changes) are so called "feature branches" - those are branched off `develop` for every new feature to be introduced into it and then merged back. We use squash merge to merge them back in case of smaller branches and sometimes merge commit in case the branch is so big it would be viable to keep it as is.

- `hotfix/`-prefixed branches may be used in a same manner as `feature/`, but with `master` branch, with a requirement of `master` being merged into `develop` after `hotfix/` branch was squash merged into `master`.

- `release/`-prefixed branches are branched off `develop` when a new stable release is slated to allow working on features for a next release and stability improvements for this release. Those are merged with a merge commit into `master` and `develop` with a stable version number increase, after which the stable version is released.

- When you're working with your local & remote branches use **fast-forward** pulls to get the changes from remote branch to local, **don't merge remote branch into local and vice versa**, this creates junk commits and makes things unsquashable.

These commands will do the following for all repositories on your PC:

1. remove the automatic merge upon pull and replace it with a rebase;

2. highlight changes consisting of moving existing lines to another location with a different color.

```
git config --global pull.rebase true
git config --global branch.autoSetupRebase always
git config --global diff.colorMoved zebra
```

5.2 Ways to help

Engine modding is a complicated process which is pretty hard to pull off, but there are also easier parts which don't require mastering the art of reverse-engineering or becoming a dank magician in C++.

5.2.1 Research and reverse-engineering

You can observe how the stuff works by using the engine and note which other stuff influences the behavior, but sooner or later you would want to see the innards of that. This is usually done using such tools as disassemblers/decompilers (IDA, Ghidra) to decipher what is written in the binary (`gamemd.exe` in case of the binary) and debuggers (Cheat Engine's debugger is pretty good for that) to trace how the binary works.

Hint: Reverse-engineering is a complex task, but don't be discouraged, if you want to try your hands at it ask us in the Discord channel, we will gladly help

---

Note: Assembly language and C++ knowledge, understanding of computer architecture, memory structure, OOP and compiler theory would certainly help.

5.2.2 Development

When you found out how the engine works and where you need to extend the logic you'd need to develop the code to achieve what you want. This is done by declaring a *hook* - some code which would be executed after the program execution reaches the certain address in binary. All the development is done in C++ using YRpp (which provides a way to interact with YR code and inject code using Syringe) and usually Visual Studio 2017/2019 or newer.

Contributing changes to the project

To contribute a feature or some sort of a change you you would need a Git client (I recommend GitKraken personally). Fork, clone the repo, preferably make a new branch, then edit/add the code or whatever you want to contribute. Commit, push, start a pull request, wait for it to get reviewed, or merged.

If you contribute something, please make sure:

- you write documentation for the change;
- you mention the change in the changelog and migration sections in the *what's new page*;
- you mention your contribution in the *credits page*.

If your change does not fit in standard criteria or too small that it doesn't need the above - add `[Minor]` to your pull request's title, so the CI won't yell at you for no reason.

Hint: Every pull request push trigger a nightly build for the latest pushed commit, so you can check the build status at the bottom of PR page, press `Show all checks`, go to details of a build run and get the zip containing built DLL and PDB (for your testers, f. ex.), or download a build from an automatically posted comment.

Note: You'd benefit from C++ experience, knowledge of programming patterns, common techniques etc. Basic assembly knowledge would help to correctly write the interaction with the memory where you hook at. Basic understanding of Git and GitHub is also needed.

5.2.3 Testing

This is a job that any modder (and even sometimes player) can do. Look at a new feature or a change, try to think of all possible cases when it can work differently, try to think of any possible logic flaws, edge cases, unforeseen interactions or conditions etc., then test it according to your thoughts. Any bugs should be reported to issues section of this repo, if possible.

Warning: **General stability** can only be achieved by extensive play-testing of new changes, both offline and online. Most modders have beta testing teams, so please, if you want the extension to be stable - contribute to that by having your testers play with the new features! Also the check-list below can help you identify issues quicker.

Testing check-list

- **All possible valid use cases covered**. Try to check all of the valid feature use cases you can think of and verify that they work as intended with the feature.

- **Correct saving and loading**. Most of the additions like new INI tags require storing them in saved object info. Sometimes this is not done correctly, especially on complex stuff (like radiation types). Please, ensure all the improvements work **identically** before and after being saved and loaded (on the same version of Phobos, of course).

- **Interaction with other features**. Try to use the feature chained or interacting with other features from vanilla or other libs (for example, mind control removal warhead initially was crashing when trying to remove mind control from a permanently mind-controlled unit).

- **Overlapping features not working correctly** (including those from third-party libs like Ares, HAres, CnCNet spawner DLL). Think of what features' code could overlap (in a technical sense; means they modify the same code) with what you're currently testing. Due to the nature of the project some features from other libs could happen to not work as expected if they are overlapping (for example, when implementing mass selection filtering Ares' `GroupAs` was initially broken and units using it weren't being type selected properly).

- **Edge cases**. Those are the cases of some specific cases usually induced by some extreme parameter values (for example, vanilla game crashes on zero-size `PreviewPack` instead of not drawing it).

- **Corner cases**. Those are similar to edge cases but are hard to reproduce and are usually induced by a combination of extreme parameter values.

Note: Knowledge on how to mod YR and having an inquisitive mind, being attentive to details would help.

5.2.4 Writing docs

No explanation needed. If you fully understand how some stuff in Phobos works you can help by writing a detailed description in these docs, or you can just improve the pieces of docs you think are not detailed enough.

The docs are written in Markdown (which is dead simple, learn MD in 60 seconds; if you need help on extended syntax have a look at MyST parser reference). We use Sphinx to build docs, Read the Docs to host.

Hint: You don't need to install Python, Sphinx and modules to see changes - every pull request you make is being built and served by Read the Docs automatically. Just like the nightly builds, scroll to the bottom, press `Show all checks` and see the built documentation in the details of a build run.

There are two ways to edit the docs.

- **Edit from your PC**. Pretty much the same like what's described in *contributing changes section*; the docs are located in the `docs` folder.

- **Edit via online editor**. Navigate to the doc piece that you want to edit, press the button on the top right - and it will take you to the file at GitHub which you would need to edit (look for the pencil icon to the top right). Press it - the fork will be created and you'll edit the docs in your version of the repo (fork). You can commit those changes (preferably to a new branch) and make them into a pull request to main repo.

Note: OK English grammar and understanding of docs structure would be enough. You would also need a GitHub account.

5.2.5 Providing media to showcase features

Those would be used in docs and with a link to the respective mod as a bonus for the mod author. To record GIFs you can use such apps as, for example, GifCam.

Note: Please, provide screenshots, GIFs and videos in their natural size and without excess stuff or length.

5.2.6 Promoting the work

You can always help us by spreading the word about the project among people, whether you're an influential youtuber, a C&C related community leader or just an average player.

CREDITS

This page lists all the individual contributions to the project by their author.

- **Belonit (Gluk-v48)**:
    - Disable empty spawn positions
    - `gamemd.exe` icon customization
    - Full-color non-paletted PCX support
    - Initial SpySat, BigGap, TransactMoney warheads
    - PCX Loading Screen support
    - Custom DiskLaser radius
    - Extended tooltips
    - Building upgrades enhancement
    - Option to hide health bar
    - Sidebar.GDIPosition
    - Help with CellSpread
    - Blowfish.dll-related errors fix
    - Zero size map previews fix
    - Semantic locomotor aliases
    - Shield logic
    - Non-ASCII input fix
    - Building Placement Preview Adjustment
    - Check for Changelog/Documentation/Credits in Pull Requests
- **Kerbiter (Metadorius)**:
    - SHP debris respect `Shadow` fix
    - Building upgrades enhancement
    - Extended tooltips
    - Selection priority filtering
    - `TurretOffset` enhancement
    - Customizable ore spawners

- – Select next idle harvester hotkey
- – Interceptor enhancement
- – Zero size map previews fix
- – LaserTrails port and rework
- – Laser graphics fixes
- – Recursive transport killer fix
- – Migration utility
- – GitHub Actions setup
- – Official docs
- – VSCode configs
- – Code style

- **Uranusian (Thrifinesma)**:
  - – Mind Control enhancement
  - – Custom warhead splash list
  - – Harvester counter
  - – Spawns promotion
  - – Shield logic
  - – Multiple death fix
  - – Customizable missing cameo
  - – Cameo sorting priority
  - – Tab hotkey placement fix
  - – Producing progress indicators
  - – Custom ore gathering anim
  - – `NoManualMove`
  - – Weapon target house filtering
  - – `DeathWeapon` fix
  - – Re-enable obsolete `JumpjetControls`
  - – `AITrigger` Building Upgrades support
  - – Wall-Gate links
  - – Ability for deployed infantry to use both weapons
  - – Observer PCX loading screen
  - – Official CN docs

- **secsome (SEC-SOME)**:
  - – Debug info dump hotkey
  - – Refactoring & porting of Ares helper code
  - – Disguise removal warhead

- Mind Control removal warhead

- Mind Control enhancement

- Shields logic help

- `AnimList.PickRandom`

- `MoveToCell` fix

- Unlimited waypoints

- `Build At` trigger action buildup anim fix

- Undeploy building into a unit plays `EVA_NewRallyPointEstablished` fix

- Custom ore gathering anim

- `TemporalClass` related crash

- Retry dialog on mission failure

- Default disguise for individual InfantryTypes

- PowerPlant Enhancer

- SaveGame Trigger Action

- QuickSave command

- Numeric variables

- Custom gravity for projectiles

- Retint map actions bugfix

- Sharpnel enhancement

- Vanilla map preview reading bugfix

- Customizable tooltip background

- **Otamaa (Fahroni, BoredEXE)**:

  - Help with CellSpread

  - Ported and fixed custom RadType code

  - Togglable ElectricBolt bolts

  - Customizable Chrono Locomotor properties per TechnoClass

  - Building Placement Preview

  - `DebrisMaximums` fixes

  - Anim-to-Unit

  - `NotHuman` anim sequences improvements

  - Customizable `OpenTopped` Properties

  - Hooks for ScriptType Actions 92 & 93

  - Ore stage threshold for `HideIfNoOre`

  - Occupied building `MuzzleFlashX` bugfix

  - `EnemyUIName=` for other TechnoTypes

  - TerrainType `DestroyAnim` & `DestroySound`

- – Laser trails for VoxelAnims
- – MakeInfantry logic on BombClass bugfix

- **FS-21**:

  - – Dump Object Info enhancements
  - – `Powered.KillSpawns`
  - – `Spawner.LimitRange`
  - – Majority of ScriptType actions
  - – MC deployer fixes
  - – Help with docs
  - – Automatic Passenger Deletion logic
  - – `Fire SW At Location/Waypoint` Trigger Action
  - – Kill Object Automatically logic prototype
  - – Customizable resource storage
  - – Override uncloaked underwater attack behavior
  - – AI Aircraft docks fix
  - – Shared ammo logic
  - – Customizable FLH when infantry is prone or deployed
  - – Initial strength for cloned infantry

- **Starkku**:

  - – Warhead shield penetration & breaking
  - – Strafing aircraft weapon customization
  - – Vehicle `DeployFire` fixes/improvements
  - – Stationary VehicleTypes
  - – Burst logic improvements
  - – TechnoType auto-firing weapons
  - – Secondary weapon fallback customization
  - – Weapon target type filtering
  - – `AreaFire` targeting customization
  - – `CreateUnit` improvements
  - – Attached animation & jumpjet unit layer customization
  - – `IsSimpleDeployer` improvements
  - – Shield modification warheads
  - – Warhead decloaking toggle
  - – Warp(In/Out)Weapon
  - – Grinder improvements / additions
  - – Attached animation position customization

- – Critical hit logic additions

- – Aircraft & jumpjet speed modifiers fix

- – Local warhead screen shaking

- – Vehicle custom palette fix

- – Feedback weapon

- – TerrainType & ore minimap color customization

- – Laser fixes & improvements

- – Mind control indicator animation cloak fix

- – Warhead / Play animation trigger animation owner fix

- – Nuke carrier & payload Bright fix

- – Display damage numbers hotkey command

- – TransactMoney.Display

- – Building-provided self-heal customization

- – AI deploy script DeploysInto fix

- – Passable & buildable-upon TerrainTypes

- – Automatic passenger owner change toggle

- – Interceptor improvements

- – OpenTopped transport rangefinding & deactivated state customizations

- – Animation damage / weapon improvements

- – Warhead self-damaging toggle

- – Trailer animation owner inheritance

- – Warhead detonation on all objects on map

- – Animated TerrainTypes extension

- – Exploding unit passenger killing customization

- – Railgun particle target coordinate fix

- – Building target coordinate offset fix

- **Morton (MortonPL)**:

  - – `XDrawOffset`

  - – Shield passthrough & absorption

  - – Building `LimboDelivery` logic

  - – Fix for `Image` in art rules

  - – Power delta counter

  - – Help with docs

- **ChrisLv_CN** (work relicensed under following permission):

  - – General assistance

  - – Interceptor logic prototype

- – LaserTrails prototype
- – Laser fixes prototype

- **Trsdy**
    - – Preserve IronCurtain status upon DeploysInto/UndeploysInto
    - – Misc jumpjet fixes:
        - * Facing towards target fix
        - * Turret direction in idle state fix
        - * Sensor fix
    - – Object Self-destruction logic
        - * Misc vanilla suicidal behavior fix
    - – Post-type-conversion update
    - – Building EVA_StructureSold and SellSound dehardcode
    - – Slaves' house customization when owner is killed
    - – Misc CN doc fix, code refactor
    - – Power delta counter : blackout indication mark
    - – Harvester counter
    - – Warhead superweapon launch logic
    - – "Shield is broken" trigger event
    - – RadialIndicator observer visibility
    - – Forbidding parallel AI queues by type
- **NetsuNegi** - Forbidding parallel AI queues by type
- **Apollo** - Translucent SHP drawing patches
- **FlyStar** - Campaign load screen PCX support
- **SukaHati (Erzoid)** - Minimum interceptor guard range
- **E1 Elite** - TileSet 255 and above bridge repair fix
- **AutoGavy** - interceptor logic, Warhead critical hit logic
- **Chasheen (Chasheenburg)** - CN docs help
- **Ares developers** - YRpp and Syringe which are used, save/load, project foundation and generally useful code from Ares, unfinished RadTypes code, prototype deployer fixes
- **tomsons26** - all-around help, assistance and guidance in reverse-engineering, YR binary mappings
- **CCHyper** - all-around help, current project logo, assistance and guidance in reverse-engineering, YR binary mappings
- **AlexB** - Original FlyingStrings implementation
- **Joshy** - Original FlyingStrings implementation
- **ZPHYUS** - win/lose themes code
- **ayylmao** - help with docs, extensive and thorough testing
- **SMxReaver** - help with docs, extensive and thorough testing

- **4SG** - help with docs

- **thomassneddon** - general assistance

- **Xkein** - general assistance, YRpp edits

- **mevitar** - honorary shield tester *triple* award

- **Damfoos** - extensive and thorough testing

- **Dmitry Volkov** - extensive and thorough testing

- **Rise of the East community** - extensive playtesting of in-dev features

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    Version 3, 29 June 2007
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NEW / ENHANCED LOGICS

This page describes all the engine features that are either new and introduced by Phobos or significantly extended or expanded.

8.1 New types / ingame entities

8.1.1 Custom Radiation Types
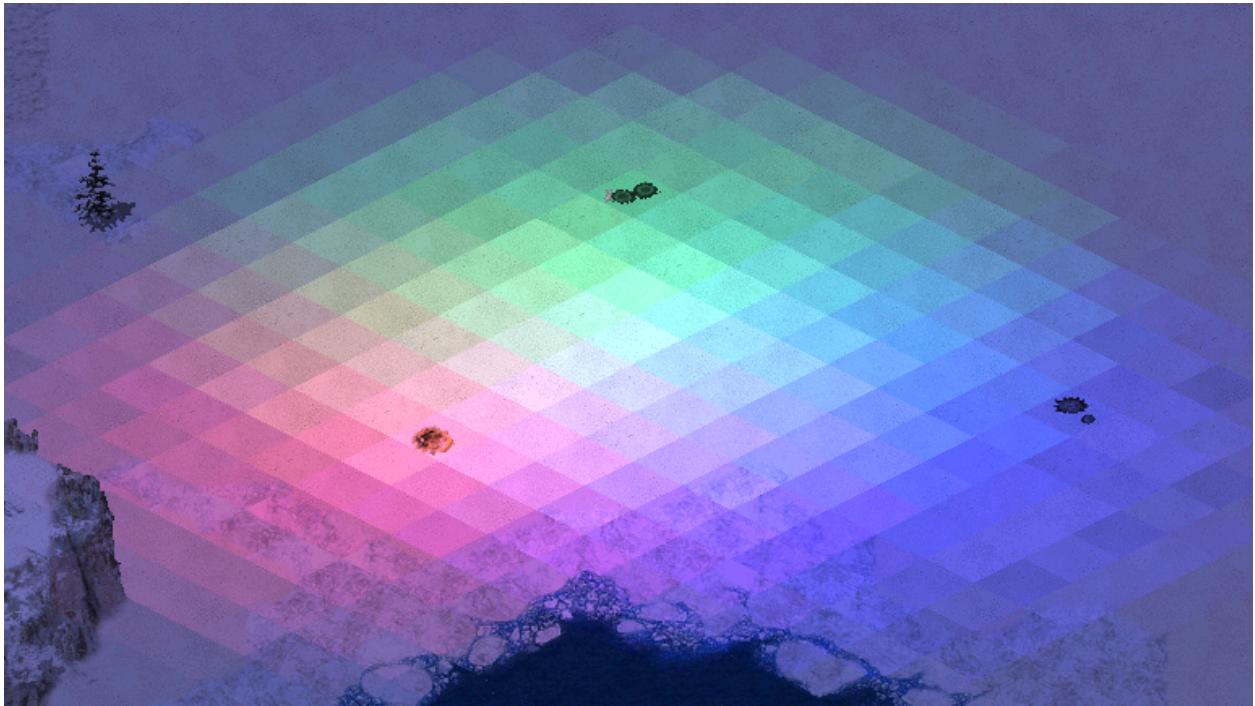
Mixing different radiation types

- Any weapon can now have a custom radiation type. More details on radiation here.

- There are several new properties available to all radiation types.

  - `RadApplicationDelay.Building` can be set to value higher than 0 to allow radiation to damage buildings.

  - `RadSiteWarhead.Detonate` can be set to make `RadSiteWarhead` detonate on affected objects rather than only be used to dealt direct damage. This enables most Warhead effects, display of animations etc.

- – RadHasOwner, if set to true, makes damage dealt by the radiation count as having been dealt by the house that fired the projectile that created the radiation field. This means that Warhead controls such as AffectsAllies will be respected and any units killed will count towards that player's destroyed units count.

- – RadHasInvoker, if set to true, makes the damage dealt by the radiation count as having been dealt by the TechnoType (the 'invoker') that fired the projectile that created the radiation field. In addition to the effects of RadHasOwner, this will also grant experience from units killed by the radiation to the invoker. Note that if the invoker dies at any point during the radiation's lifetime it continues to behave as if not having an invoker.

- By default UseGlobalRadApplicationDelay is set to true. This makes game always use RadApplicationDelay and RadApplicationDelay.Building from [Radiation] rather than specific radiation types. This is a performance-optimizing measure that should be disabled if a radiation type declares different application delay.

In rulesmd.ini:

```ini
[RadiationTypes]
0=SOMERADTYPE

[Radiation]
UseGlobalRadApplicationDelay=true   ; boolean

[SOMEWEAPON]                         ; WeaponType
RadType=Radiation                    ; RadType to use instead of default of [Radiation]

[SOMERADTYPE]                        ; RadType
RadDurationMultiple=1                ; integer
RadApplicationDelay=16               ; integer
RadApplicationDelay.Building=0       ; integer
RadLevelMax=500                      ; integer
RadLevelDelay=90                     ; integer
RadLightDelay=90                     ; integer
RadLevelFactor=0.2                   ; floating point value
RadLightFactor=0.1                   ; floating point value
RadTintFactor=1.0                    ; floating point value
RadColor=0,255,0                     ; integer - Red,Green,Blue
RadSiteWarhead=RadSite               ; WarheadType
RadSiteWarhead.Detonate=false        ; boolean
RadHasOwner=false                    ; boolean
RadHasInvoker=false                  ; boolean
```

8.1.2 Laser Trails

Laser trails used in Rise of the East

- Technos, Projectiles, and VoxelAnims can now have colorful trails of different transparency, thickness and color, which are drawn via laser drawing code.

- Technos, Projectiles, and VoxelAnims can have multiple laser trails. For technos each trail can have custom laser trail type and FLH offset relative to turret and body.

> **Warning:** Laser trails are very resource intensive! Due to the game not utilizing GPU having a lot of trails can quickly drop the FPS on even good machines. To reduce that effect:
>
> - don't put too many laser trails on units and projectiles;
>
> - make sure you set as high `SegmentLength` value as possible without trails being too jagged;
>
> - try to keep the length of the trail minimal (can be achieved with smaller `FadeDuration` durations).

In `artmd.ini`:

```
[LaserTrailTypes]
0=SOMETRAIL

[SOMETRAIL]                   ; LaserTrailType name
IsHouseColor=false            ; boolean
Color=255,0,0                 ; integer - Red,Green,Blue
FadeDuration=64               ; integer
Thickness=4                   ; integer
SegmentLength=128             ; integer, minimal length of each trail segment
IgnoreVertical=false          ; boolean, whether the trail won't be drawn on vertical
→movement
IsIntense=false               ; boolean, whether the laser is "supported" (AKA prism
→forwarding)
CloakVisible=false            ; boolean, whether the laser is visible when the attached
→unit is cloaked

[SOMEPROJECTILE]              ; BulletType Image
LaserTrail.Types=SOMETRAIL    ; list of LaserTrailTypes

[SOMETECHNO]                  ; TechnoType Image
LaserTrailN.Type=SOMETRAIL    ; LaserTrailType
LaserTrailN.FLH=0,0,0         ; integer - Forward,Lateral,Height
LaserTrailN.IsOnTurret=false  ; boolean, whether the trail origin is turret
; where N = 0, 1, 2, ...
```

In `rulesmd.ini`:

```
[SOMEVOXELANIM]               ; VoxelAnim
LaserTrail.Types=SOMETRAIL    ; list of LaserTrailTypes
```

8.1.3 Shields

Buildings, Infantries and Vehicles with Shield in Fantasy ADVENTURE

In `rulesmd.ini`:

```
[AudioVisual]
Pips.Shield=-1,-1,-1                 ; integer, frames of pips.shp (zero-based) for Green,
→Yellow, Red
Pips.Shield.Building=-1,-1,-1        ; integer, frames of pips.shp (zero-based) for Green,
→Yellow, Red
Pips.Shield.Background=PIPBRD.SHP    ; filename - including the .shp/.pcx extension
```

(continues on next page)

```
Pips.Shield.Building.Empty=0        ; integer, frame of pips.shp (zero-based) for empty␣
↪building pip

[ShieldTypes]
0=SOMESHIELDTYPE

[SOMESHIELDTYPE]                       ; ShieldType name
Strength=0                            ; integer
InitialStrength=0                     ; integer
Armor=none                            ; ArmorType
Powered=false                         ; boolean
AbsorbOverDamage=false                ; boolean
SelfHealing=0.0                       ; double, percents or absolute
SelfHealing.Rate=0.0                  ; double, ingame minutes
Respawn=0.0                           ; double, percents or absolute
Respawn.Rate=0.0                      ; double, ingame minutes
BracketDelta=0                        ; integer - pixels
Pips=-1,-1,-1                         ; integer, frames of pips.shp (zero-based) for␣
↪Green, Yellow, Red
Pips.Building=-1,-1,-1                ; integer, frames of pips.shp (zero-based) for␣
↪Green, Yellow, Red
Pips.Background=                      ; filename - including the .shp/.pcx extension
Pips.Building.Empty=                  ; integer, frame of pips.shp (zero-based) for empty␣
↪building pip
IdleAnim=                             ; Animation
IdleAnim.ConditionYellow=             ; Animation
IdleAnim.ConditionRed=                ; Animation
IdleAnimDamaged=                      ; Animation
IdleAnimDamaged.ConditionYellow=      ; Animation
IdleAnimDamaged.ConditionRed=         ; Animation
IdleAnim.OfflineAction=Hides          ; AttachedAnimFlag (None, Hides, Temporal, Paused␣
↪or PausedTemporal)
IdleAnim.TemporalAction=Hides         ; AttachedAnimFlag (None, Hides, Temporal, Paused␣
↪or PausedTemporal)
BreakAnim=                            ; Animation
HitAnim=                              ; Animation
BreakWeapon=                          ; WeaponType
AbsorbPercent=1.0                     ; floating point value
PassPercent=0.0                       ; floating point value
AllowTransfer=                        ; boolean
ImmuneToBerserk=no                    ; boolean

[SOMETECHNO]                          ; TechnoType
ShieldType=SOMESHIELDTYPE             ; ShieldType; none by default

[SOMEWARHEAD]                         ; WarheadType
Shield.Penetrate=false                ; boolean
Shield.Break=false                    ; boolean
Shield.BreakAnim=                     ; Animation
Shield.HitAnim=                       ; Animation
Shield.BreakWeapon=                   ; WeaponType
Shield.AbsorbPercent=                 ; floating point value
```

```
Shield.PassPercent=                 ; floating point value
Shield.Respawn.Duration=0           ; integer, game frames
Shield.Respawn.Amount=0.0           ; floating point value, percents or absolute
Shield.Respawn.Rate=-1.0            ; floating point value, ingame minutes
Shield.Respawn.ResetTimer=false     ; boolean
Shield.SelfHealing.Duration=0       ; integer, game frames
Shield.SelfHealing.Amount=0.0       ; floating point value, percents or absolute
Shield.SelfHealing.Rate=-1.0        ; floating point value, ingame minutes
Shield.SelfHealing.ResetTimer=false ; boolean
Shield.AffectTypes=                 ; List of ShieldType names
Shield.AttachTypes=                 ; List of ShieldType names
Shield.RemoveTypes=                 ; List of ShieldType names
Shield.ReplaceOnly=false            ; boolean
Shield.ReplaceNonRespawning=false   ; boolean
Shield.MinimumReplaceDelay=0        ; integer, game frames
Shield.InheritStateOnReplace=false  ; boolean
```

- Now you can have a shield for any TechnoType. It serves as a second health pool with independent `Armor` and `Strength` values.

  - Negative damage will recover shield, unless shield has been broken. If shield isn't full, all negative damage will be absorbed by shield.

    * Negative damage weapons will consider targets with active, but not at full health shields in need of healing / repairing unless the Warhead has `Shield.Penetrate=true`, in which case only object health is considered.

  - When a TechnoType has an unbroken shield, `[ShieldType]->Armor` will replace `[TechnoType]->Armor` for game calculation.

  - `InitialStrength` can be used to set a different initial strength value from maximum.

- When executing `DeploysInto` or `UndeploysInto`, if both of the TechnoTypes have shields, the transformed unit/building would keep relative shield health (in percents), same as with `Strength`. If one of the TechnoTypes doesn't have shields, it's shield's state on conversion will be preserved until converted back.

  - This also works with Ares' `Convert.*`.

- `Powered` controls whether or not the shield is active when a unit is running low on power or it is affected by EMP.

  - Attention, if TechnoType itself is not `Powered`, then the shield won't be offline when low power.

- `AbsorbOverDamage` controls whether or not the shield absorbs damage dealt beyond shield's current strength when the shield breaks.

- `SelfHealing` and `Respawn` respect the following settings: 0.0 disables the feature, 1%-100% recovers/respawns the shield strength in percentage, other number recovers/respawns the shield strength directly. Specially, `SelfHealing` with a negative number deducts the shield strength.

  - If you want shield recovers/respawns 1 HP per time, currently you need to set tag value to any number between 1 and 2, like `1.1`.

- `SelfHealing.Rate` and `Respawn.Rate` respect the following settings: 0.0 instantly recovers the shield, other values determine the frequency of shield recovers/respawns in ingame minutes.

- `IdleAnim`, if set, will be played while the shield is intact. This animation is automatically set to loop indefinitely.

- IdleAnim.ConditionYellow and IdleAnim.ConditionRed can be used to set different animations for when shield health is at or below the percentage defined in [AudioVisual]->ConditionYellow/ConditionRed, respectively. If IdleAnim.ConditionRed is not set it falls back to IdleAnim.ConditionYellow, which in turn falls back to IdleAnim.

- IdleAnimDamaged, IdleAnimDamaged.ConditionYellow and IdleAnimDamaged.ConditionRed are used in an identical manner, but only when health of the object the shield is attached to is at or below [AudioVisual]->ConditionYellow. Follows similar fallback sequence to regular IdleAnim variants and if none are set, falls back to the regular IdleAnim or variants thereof.

- Bouncer=true and IsMeteor=true animations can exhibit irregular behaviour when used as IdleAnim and should be avoided.

- IdleAnim.OfflineAction indicates what happens to the animation when the shield is in a low power state.

- IdleAnim.TemporalAction indicates what happens to the animation when the shield is attacked by temporal weapons.

- BreakAnim, if set, will be played when the shield has been broken.

- HitAnim, if set, will be played when the shield is attacked, similar to WeaponNullifyAnim for Iron Curtain.

- BreakWeapon, if set, will be fired at the TechnoType once the shield breaks.

- AbsorbPercent controls the percentage of damage that will be absorbed by the shield. Defaults to 1.0, meaning full damage absorption.

- PassPercent controls the percentage of damage that will *not* be absorbed by the shield, and will be dealt to the unit directly even if the shield is active. Defaults to 0.0 - no penetration.

- AllowTransfer controls whether or not the shield can be transferred if the TechnoType changes (such as (Un)DeploysInto or Ares type conversion). If not set, defaults to true if shield was attached via Shield.AttachTypes, otherwise false.

- ImmuneToBerserk gives the immunity against Psychedelic=yes warhead. Otherwise the berserk effect penetrates shields by default. Note that this shouldn't prevent the unit from targeting at the shielded object. Versus.shieldArmor=0% is still required in this case.

- A TechnoType with a shield will show its shield Strength. An empty shield strength bar will be left after destroyed if it is respawnable. Several customizations are available for the shield strength pips.

   - By default, buildings use the 6th frame of pips.shp to display the shield strength while others use the 17th frame.

   - Pips.Shield can be used to specify which pip frame should be used as shield strength. If only 1 digit is set, then it will always display that frame, or if 3 digits are set, it will use those if shield's current strength is at or below ConditionYellow and ConditionRed, respectively. Pips.Shield.Building is used for BuildingTypes. -1 as value will use the default frame, whether it is fallback to first value or the aforementioned hardcoded defaults.

   - Pips.Shield.Background can be used to set the background or 'frame' for non-building pips, which defaults to pipbrd.shp. 4th frame is used to display an infantry's shield strength and the 3th frame for other units, or 2nd and 1st respectively if not enough frames are available.

   - Pips.Shield.Building.Empty can be used to set the frame of pips.shp displayed for empty building strength pips, defaults to 1st frame of pips.shp.

   - The above customizations are also available on per ShieldType basis, e.g [ShieldType]->Pips instead of [AudioVisual]->Pips.Shield and so on. ShieldType settings take precedence over the global ones, but will fall back to them if not set.

   - BracketDelta can be used as additional vertical offset (negative shifts it up) for shield strength bar. Much like PixelSelectionBracketDelta, it is not applied on buildings.

- Warheads have new options that interact with shields.

    - `Shield.Penetrate` allows the warhead ignore the shield and always deal full damage to the TechnoType itself. It also allows targeting the TechnoType as if shield doesn't exist.

    - `Shield.Break` allows the warhead to always break shields of TechnoTypes. This is done before damage is dealt.

    - `Shield.BreakAnim` will be displayed instead of ShieldType `BreakAnim` if the shield is broken by the Warhead, either through damage or `Shield.Break`.

    - `Shield.HitAnim` will be displayed instead of ShieldType `HitAnim` if set when Warhead hits the shield.

    - `Shield.BreakWeapon` will be fired instead of ShieldType `BreakWeapon` if the shield is broken by the Warhead, either through damage or `Shield.Break`.

    - `Shield.AbsorbPercent` overrides the `AbsorbPercent` value set in the ShieldType that is being damaged.

    - `Shield.PassPercent` overrides the `PassPercent` value set in the ShieldType that is being damaged.

    - `Shield.Respawn.Rate` & `Shield.Respawn.Amount` override ShieldType `Respawn.Rate` and `Respawn.Amount` for duration of `Shield.Respawn.Duration` amount of frames. Negative rate & zero or lower amount default to ShieldType values. If `Shield.Respawn.ResetTimer` is set, currently running shield respawn timer is reset, otherwise the timer's duration is adjusted to match `Shield.Respawn.Rate` without restarting the timer. If the effect expires while respawn timer is running, remaining time is adjusted to match ShieldType `Respawn.Rate`. Re-applying the effect resets the duration to `Shield.Respawn.Duration`

    - `Shield.SelfHealing.Rate` & `Shield.SelfHealing.Amount` override ShieldType `SelfHealing.Rate` and `SelfHealing.Amount` for duration of `Shield.SelfHealing.Duration` amount of frames. Negative rate & zero or lower amount default to ShieldType values. If `Shield.SelfHealing.ResetTimer` is set, currently running self-healing timer is restarted, otherwise timer's duration 'is adjusted to match `Shield.SelfHealing.Rate` without restarting the timer. If the effect expires while self-healing timer is running, remaining time is adjusted to match ShieldType `SelfHealing.Rate`. Re-applying the effect resets the duration to `Shield.SelfHealing.Duration`.

    - `Shield.AffectsTypes` allows listing which ShieldTypes can be affected by any of the effects listed above. If none are listed, all ShieldTypes are affected.

    - `Shield.AttachTypes` & `Shield.RemoveTypes` allows listing ShieldTypes that are attached or removed, respectively from any targets affected by the warhead (positive `Verses` values). Normally only first listed ShieldType in `Shield.AttachTypes` is applied.

        * If `Shield.ReplaceOnly` is set, shields from `Shield.AttachTypes` are only applied to affected targets from which shields were simultaneously removed, matching the order listed in `Shield.RemoveTypes`. If `Shield.AttachTypes` contains less items than `Shield.RemoveTypes`, last item from the former is used for any remaining removed shields.

        * If `Shield.ReplaceNonRespawning` is set, shield from `Shield.AttachTypes` replaces existing shields that have been broken and cannot respawn on their own.

            · `Shield.MinimumReplaceDelay` can be used to control how long after the shield has been broken (in game frames) can it be replaced. If not enough frames have passed, it won't be replaced.

        * If `Shield.InheritStateOnReplace` is set, shields replaced via `Shield.ReplaceOnly` inherit the current strength (relative to ShieldType `Strength`) of the previous shield and whether or not the shield was currently broken. Self-healing and respawn timers are always reset.

8.2 Animations

8.2.1 Anim-to-Unit

- Animations can now create (or "convert" to) vehicles when they end via `CreateUnit`.

  - `CreateUnit.Owner` determines which house will own the created VehicleType. This only works as expected if the animation has owner set.

    * Vehicle *destroy animations*, animations from Warhead `AnimList`/`SplashList` and map trigger action `41 Play Anim At` will have the owner set correctly.

    * `CreateUnit.RemapAnim`, if set to true, will cause the animation to be drawn in unit palette and remappable to owner's team color.

  - `CreateUnit.Mission` determines the initial mission of the created VehicleType.

  - `CreateUnit.Facing` determines the initial facing of created VehicleType.

    * `CreateUnit.RandomFacing`, if set to true makes it so that a random facing is picked instead.

    * `CreateUnit.InheritFacings` and `CreateUnit.InheritTurretFacings` inherit facings for vehicle body and turret respectively from the destroyed vehicle if the animation is a vehicle destroy animation.

  - `CreateUnit.ConsiderPathfinding`, if set to true, will consider whether or not the cell where the animation is located is occupied by other objects or impassable to the vehicle being created and will attempt to find a nearby cell that is not. Otherwise the vehicle will be created at the animation's location despite these obstacles.

In `artmd.ini`:

```
[SOMEANIM]                              ; AnimationType
CreateUnit=                             ; VehicleType
CreateUnit.Owner=Victim                 ; Owner house kind, Invoker/Killer/Victim/
→Civilian/Special/Neutral/Random
CreateUnit.RemapAnim=false              ; boolean
CreateUnit.Mission=Guard                ; MissionType
CreateUnit.Facing=0                     ; integer, facings in range of 0-255
CreateUnit.RandomFacing=true            ; boolean
CreateUnit.InheritFacings=false         ; boolean
CreateUnit.InheritTurretFacings=false   ; boolean
CreateUnit.ConsiderPathfinding=false    ; boolean
```

8.3 Buildings

8.3.1 Extended building upgrades

Upgrading own and allied Power Plants in CnC: Final War

Note: Due to technical limitations, with Ares, upgrades placed through `PowersUp.Buildings` instead of `PowersUpBuilding` (note that internally `PowersUpBuilding` is set to first entry of `PowersUp.Buildings` if former is not set but latter is) **DO NOT** satisfy prerequisites. Suggested workaround is to use the upgrades to provide Superweapons that spawn in buildings via *LimboDelivery* logic to function as prerequisites, which are destroyed by another SW that becomes available if parent building is gone and so on.

- Building upgrades now can be placed on own buildings, on allied buildings and/or on enemy buildings. These three owners can be specified by `PowersUp.Owner`. When upgrade is placed on building, it automatically changes it's owner to match the building's owner.

- One upgrade can now be applied to multiple different types of buildings specified by `PowersUp.Buildings`.

  - Ares-introduced build limit for building upgrades works with this feature.

In `rulesmd.ini`:

```
[UPGRADENAME]        ; BuildingType
PowersUp.Owner=Self ; list of Affected House Enumeration (none|owner/self|allies/
→ally|team|enemies/enemy|all)
PowersUp.Buildings= ; list of BuildingTypes
```

8.3.2 Power plant enhancer

- When it exists, it can increase the power amount generated by the power plants.

  - When enchancing structures are sold or destroyed, the power amount returns to normal.

In `rulesmd.ini`:

```
[SOMEBUILDING]                  ; BuildingType
PowerPlantEnhancer.PowerPlants=    ; list of BuildingTypes
PowerPlantEnhancer.Amount=0        ; integer
PowerPlantEnhancer.Factor=1.0      ; floating point value
```

8.4 Infantry

8.4.1 Customizable FLH When Infantry Is Prone Or Deployed

- Now infantry can override `PrimaryFireFLH` and `SecondaryFireFLH` if is prone (crawling) or deployed. Also works in conjunction with *burst-index specific firing offsets*.

In `artmd.ini`:

```
[SOMEINFANTRY]            ; InfantryType
PronePrimaryFireFLH=        ; integer - Forward,Lateral,Height
ProneSecondaryFireFLH=      ; integer - Forward,Lateral,Height
DeployedPrimaryFireFLH=     ; integer - Forward,Lateral,Height
DeployedSecondaryFireFLH=   ; integer - Forward,Lateral,Height
```

8.4.2 Default disguise for individual InfantryTypes

- Infantry can now have its `DefaultDisguise` overridden per-type.

  - This tag's priority is higher than Ares' per-side `DefaultDisguise`.

In `rulesmd.ini`:

```
[SOMEINFANTRY]        ; InfantryType
DefaultDisguise=E2  ; InfantryType
```

8.4.3 Random death animaton for NotHuman Infantry

- Infantry with `NotHuman=yes` can now play random death anim sequence between `Die1` to `Die5` instead of the hardcoded `Die1`.

  - Do not forget to tweak infantry anim sequences before enabling this feature, otherwise it will play invisible anim sequence.

In `rulesmd.ini`:

```
[SOMEINFANTRY]                      ; InfantryType
NotHuman.RandomDeathSequence=yes  ; boolean
```

8.4.4 Shared Ammo

- Transports with `OpenTopped=yes` and `Ammo.Shared=yes` will transfer ammo to passengers that have `Ammo.Shared=yes`. In addition, a transport can filter who will receive ammo if passengers have the same value in `Ammo.Shared.Group=<integer>` of the transport, ignoring other passengers with different groups values.

- Transports with `Ammo.Shared.Group=-1` will transfer ammo to any passenger with `Ammo.Shared=yes` ignoring the group.

- Transports must have ammo and should be able to reload ammo.

In `rulesmd.ini`:

```
[SOMETECHNO1]            ; TechnoType, transport with OpenTopped=yes
Ammo.Shared=no          ; boolean
Ammo.Shared.Group=-1    ; integer


[SOMETECHNO2]            ; TechnoType, passenger
Ammo.Shared=no          ; boolean
Ammo.Shared.Group=-1    ; integer
```

8.4.5 Slaves' house decision customization when owner is killed

- You can now decide the slaves' house when the corresponding slave miner is killed using `Slaved.OwnerWhenMasterKilled`:

    - `suicide`: Kill each slave if the slave miner is killed.

    - `master`: Free the slaves but keep the house of the slave unchanged.

    - `neutral`: The slaves belong to civilian house.

    - `killer`: Free the slaves and give them to the house of the slave miner's killer. (vanilla behavior)

In `rulesmd.ini`

```
[SOMEINFANTRY]                           ; Slave type
Slaved=yes
Slaved.OwnerWhenMasterKilled=killer  ; enumeration (suicide | master | killer | neutral)
```

8.5 Projectiles

8.5.1 Projectile interception logic

Interception logic used in Tiberium Crisis mod

- Projectiles can now be made interceptable by certain TechnoTypes by setting `Interceptable=true` on them. The TechnoType scans for interceptable projectiles within a range if it has no other target and will use one of its weapons to shoot at them. Projectiles can define `Armor` and `Strength`. Weapons that cannot target the projectile's armor type will not attempt to intercept it. On interception, if the projectile has `Armor` set, an amount equaling to the intercepting weapon's `Damage` adjusted by Warhead `Verses` and the TechnoType's firepower multipliers is deducted from the projectile's current strength. Regardless of if the current projectile strength was reduced or not, if it sits at 0 or below after interception, the projectile is detonated.

    - `Interceptor.Weapon` determines the weapon (0 = `Primary`, 1 = `Secondary`) to be used for intercepting projectiles.

* The interceptor weapon may need AG and/or AA set to true on its projectile to be able to target projectiles depending on their elevation from ground. If you don't set those then the weapon won't be able to target low-flying or high-flying projectiles respectively.

– `Interceptor.CanTargetHouses` controls which houses the projectiles (or rather their firers) can belong to be eligible for interception.

– `Interceptor.GuardRange` (and `Interceptor.(Rookie|Veteran|EliteGuardRange)`) is maximum range of the unit to intercept projectile. The unit weapon range will limit the unit interception range though.

– `Interceptor.MinimumGuardRange` (and `Interceptor.(Rookie|Veteran|EliteMinimumGuardRange)`) is the minimum range of the unit to intercept projectile. Any projectile under this range will not be intercepted.

– `Interceptable.DeleteOnIntercept` determines whether or not the projectile will simply be deleted on detonation upon interception, or if it will properly detonate. Will be overridden by `Interceptor.DeleteOnIntercept` setting on the interceptor.

– `Interceptable.WeaponOverride` can be set to a WeaponType that will be used to override characteristics such as `Damage` and `Warhead` of the current projectile for detonation after interception. Will be overridden by `Interceptor.WeaponOverride` setting on the interceptor.

* On interceptors, `Interceptor.WeaponReplaceProjectile` can be set to true to make `Interceptor.WeaponOverride` also replace the intercepted projectile's type (including `Image` and other projectile characteristics) and `Speed` with its own. Does not replace particle systems (`AttachedSystem`, *Ares feature*).

* On interceptors, `Interceptor.WeaponCumulativeDamage` can be set to true to make `Damage` from `Interceptor.WeaponOverride` weapon be added on the projectile's damage rather than override it.

– `Interceptor.KeepIntact` can be set to true to allow intercepted projectiles to continue traveling as if they were not intercepted, but effects such as `Interceptor.WeaponOverride` will still be applied.

In `rulesmd.ini`:

```
[SOMETECHNO]                                ; TechnoType
Interceptor=false                           ; boolean
Interceptor.Weapon=0                        ; integer, weapon slot index (0 or 1)
Interceptor.CanTargetHouses=enemies         ; Affected House Enumeration (none|owner/
→self|allies|ally|team|enemies|enemy|all)
Interceptor.GuardRange=0.0                  ; floating point value
Interceptor.VeteranGuardRange=              ; floating point value
Interceptor.EliteGuardRange=                ; floating point value
Interceptor.MinimumGuardRange=0.0           ; floating point value
Interceptor.VeteranMinimumGuardRange=       ; floating point value
Interceptor.EliteMinimumGuardRange=         ; floating point value
Interceptor.DeleteOnIntercept=false         ; boolean
Interceptor.WeaponOverride=                 ; WeaponType
Interceptor.WeaponReplaceProjectile=false   ; boolean
Interceptor.WeaponCumulativeDamage=false    ; boolean
Interceptor.KeepIntact=false                ; boolean


[SOMEPROJECTILE] ; Projectile
Interceptable=false                 ; boolean
Interceptable.DeleteOnIntercept=false   ; boolean
Interceptable.WeaponOverride=       ; WeaponType
Strength=0                          ; integer
Armor=                              ; ArmorType
```

8.5.2 Projectile trajectories

- Projectiles can now have customizable trajectories.

    - `Trajectory` should not be combined with original game's projectile trajectory logics (`Arcing`, `ROT` or `Inviso`).

    - Initial speed of the projectile is defined by `Trajectory.Speed`, which unlike `Speed` used by `ROT > 0` projectiles is defined on projectile not weapon.

    In `rulesmd.ini`:

```
[SOMEPROJECTILE]        ; Projectile
Trajectory.Speed=100.0  ; floating point value
```

Straight trajectory

Straight trajectory used to make blasters in a private mod by @brsajo#9745

- Self-explanatory, is a straight-shot trajectory.

In `rulesmd.ini`:

```
[SOMEPROJECTILE]     ; Projectile
Trajectory=Straight  ; Trajectory type
```

Bombard trajectory

- Similar trajectory to `Straight`, but targets a coordinate above the intended target (height determined by `Trajectory.Bombard.Height`). When the projectile approaches that coordinate, it will free fall and explodes when it hits the target or ground.

In `rulesmd.ini`:

```
[SOMEPROJECTILE]                  ; Projectile
Trajectory=Bombard                ; Trajectory type
Trajectory.Bombard.Height=0.0  ; double
```

8.5.3 Shrapnel enhancement

Shrapnel appearing against ground & buildings (Project Phantom)

- Shrapnel behavior can be triggered on the ground and buildings.

In `rulesmd.ini`:

```
[SOMEPROJECTILE]                  ; Projectile
Shrapnel.AffectsGround=false     ; boolean
Shrapnel.AffectsBuildings=false  ; boolean
```

8.6 Super Weapons

8.6.1 LimboDelivery

- Super Weapons can now deliver off-map buildings that act as if they were on the field.

  - `LimboDelivery.Types` is the list of BuildingTypes that will be created when the Super Weapons fire. Super Weapon Type and coordinates do not matter.

  - `LimboDelivery.IDs` is the list of numeric IDs that will be assigned to buildings. Necessary for LimboKill to work.

- Created buildings are not affected by any on-map threats. The only way to remove them from the game is by using a Super Weapon with LimboKill set.

  - `LimboKill.Affects` sets which houses are affected by this feature.

  - `LimboKill.IDs` lists IDs that will be targeted. Buildings with these IDs will be removed from the game instantly.

- Delivery can be made random with these optional tags. The game will randomly choose only a single building from the list for each roll chance provided.

  - `LimboDelivery.RollChance` lits chances of each "dice roll" happening. Valid values range from 0% (never happens) to 100% (always happens). Defaults to a single sure roll.

  - `LimboDelivery.RandomWeightsN` lists the weights for each "dice roll" that increase the probability of picking a specific building. Valid values are 0 (don't pick) and above (the higher value, the bigger the likelyhood). `RandomWeights` are a valid alias for `RandomWeights0`. If a roll attempt doesn't have weights specified, the last weights will be used.

Note: This feature might not support every building flag. Flags that are confirmed to work correctly are listed below:

- FactoryPlant

- OrePurifier

- SpySat

- KeepAlive (Ares 3.0)

- Prerequisite, PrerequisiteOverride, Prerequisite.List# (Ares 0.1), Prerequisite.Negative (Ares 0.1), GenericPrerequisites (Ares 0.1)

- SuperWeapon, SuperWeapon2, SuperWeapons (Ares 0.9), SW.AuxBuildings (Ares 0.9), SW.NegBuildings (Ares 0.9)

Note: In order for this feature to work with AITriggerTypes conditions ("Owning house owns ???" and "Enemy house owns ???"), `LegalTarget` must be set to true.

> **Warning:** Remember that Limbo Delivered buildings don't exist physically! This means they should never have enabled machanics that require interaction with the game world (i.e. factories, cloning vats, service depots, helipads). They also **should have either `KeepAlive=no` set or be killable with LimboKill** - otherwise the game might never end.

In `rulesmd.ini`:

```
[SOMESW]                          ; Super Weapon
LimboDelivery.Types=              ; List of BuildingTypes
LimboDelivery.IDs=                ; List of numeric IDs. -1 cannot be used.
LimboDelivery.RollChances=        ; List of percentages.
LimboDelivery.RandomWeightsN=     ; List of integers.
LimboKill.Affects=self            ; Affected House Enumeration (none|owner/self|allies/
↪ally|team|enemies/enemy|all)
LimboKill.IDs=                    ; List of numeric IDs.
```

8.7 Technos

8.7.1 Automatic passenger deletion

- Transports with these tags will erase the passengers overtime. Bigger units takes more time. Optionally this logic can work like a grinder.

- Good combination with Ares Abductor logic.

In `rulesmd.ini`:

```
[SOMETECHNO]                                  ; TechnoType
PassengerDeletion.Rate=0                       ; integer, game frames
PassengerDeletion.Rate.SizeMultiply=true       ; boolean, whether to multiply frames amount␣
↪by size
PassengerDeletion.Soylent=no                   ; boolean
PassengerDeletion.SoylentFriendlies=false      ; boolean
PassengerDeletion.ReportSound=                 ; Sound
PassengerDeletion.Anim=                        ; Animation
```

8.7.2 Automatic passenger owner change to match transport owner

- Transports with `Passengers.SyncOwner` set to true will have the owner of their passengers changed to match the transport if transport's owner changes.

    - On `OpenTopped=true` transports this will also disable checks that prevent target acquisition by passengers when the transport is temporarily mind controlled.

    - `Passengers.SyncOwner.RevertOnExit`, if set to true (which is the default), changes the passengers' owner back to whatever it was originally when they entered the transport when they are ejected.

    - Does not work on passengers acquired through use of `Abductor=true` weapon *(Ares feature)*.

In `rulesmd.ini`:

```
[SOMETECHNO]                                  ; TechnoType
Passengers.SyncOwner=false                     ; boolean
Passengers.SyncOwner.RevertOnExit=true         ; boolean
```

8.7.3 Automatically firing weapons

- You can now make TechnoType automatically fire its weapon(s) without having to scan for suitable targets by setting `AutoFire`, on either its base cell (in which case the weapon that is used for force-firing is used) or itself (in which case normal targeting and weapon selection rules and are respected) depending on if `AutoFire.TargetSelf` is set or not.

In `rulesmd.ini`:

```
[SOMETECHNO]               ; TechnoType
AutoFire=false             ; boolean
AutoFire.TargetSelf=false  ; boolean
```

8.7.4 Customizable OpenTopped properties

- You can now override global `OpenTopped` transport properties per TechnoType.

- `OpenTopped.IgnoreRangefinding` can be used to disable `OpenTopped` transport rangefinding behaviour where smallest weapon range between transport and all passengers is used when approaching targets that are out of range and when scanning for potential targets.

- `OpenTopped.AllowFiringIfDeactivated` can be used to customize whether or not passengers can fire out when the transport is deactivated (EMP, powered unit etc).

```
[SOMETECHNO]                               ; TechnoType
OpenTopped.RangeBonus=                     ; integer, override of the global default
OpenTopped.DamageMultiplier=               ; floating point value, override of the global
↪default
OpenTopped.WarpDistance=                   ; integer, override of the global default
OpenTopped.IgnoreRangefinding=false        ; boolean
OpenTopped.AllowFiringIfDeactivated=true   ; boolean
```

8.7.5 Disabling fallback to (Elite)Secondary weapon

- It is now possible to disable the fallback to `(Elite)Secondary` weapon from `(Elite)Primary` weapon if it cannot fire at the chosen target by setting `NoSecondaryWeaponFallback` to true (defaults to false). This does not apply to special cases where `(Elite)Secondary` weapon is always chosen, including but not necessarily limited to the following:

  - `OpenTransportWeapon=1` on an unit firing from inside `OpenTopped=true` transport.

  - `NoAmmoWeapon=1` on an unit with `Ammo` value higher than 0 and current ammo count lower or equal to `NoAmmoAmount`.

  - Deployed `IsSimpleDeployer=true` units with`DeployFireWeapon=1` set or omitted.

  - `DrainWeapon=true` weapons against enemy `Drainable=yes` buildings.

  - Units with `IsLocomotor=true` set on `Warhead` of `(Elite)Primary` weapon against buildings.

  - Weapons with `ElectricAssault=true` set on `Warhead` against `Overpowerable=true` buildings belonging to owner or allies.

  - `Overpowerable=true` buildings that are currently overpowered.

  - Any system using `(Elite)WeaponX`, f.ex `Gunner=true` or `IsGattling=true` is also wholly exempt.

In `rulesmd.ini`:

```
[SOMETECHNO]                        ; TechnoType
NoSecondaryWeaponFallback=false  ; boolean
```

8.7.6 Firing offsets for specific Burst shots

- You can now specify separate firing offsets for each of the shots fired by weapon with `Burst` via using `(Elite)(Prone/Deployed)PrimaryFire|SecondaryFire|WeaponX|FLH.BurstN` keys, depending on which weapons your TechnoType makes use of. *N* in `BurstN` is zero-based burst shot index, and the values are parsed sequentially until no value for either regular or elite weapon is present, with elite weapon defaulting to regular weapon FLH if only it is missing. If no burst-index specific value is available, value from the base key (f.ex `PrimaryFireFLH`) is used.

- Burst-index specific firing offsets are absolute firing offsets and the lateral shifting based on burst index that occurs with the base firing offsets is not applied.

In `artmd.ini`:

```
[SOMETECHNO]     ; TechnoType Image
FLHKEY.BurstN=  ; integer - Forward,Lateral,Height. FLHKey refers to weapon-specific FLH
→key name and N is zero-based burst shot index.
```
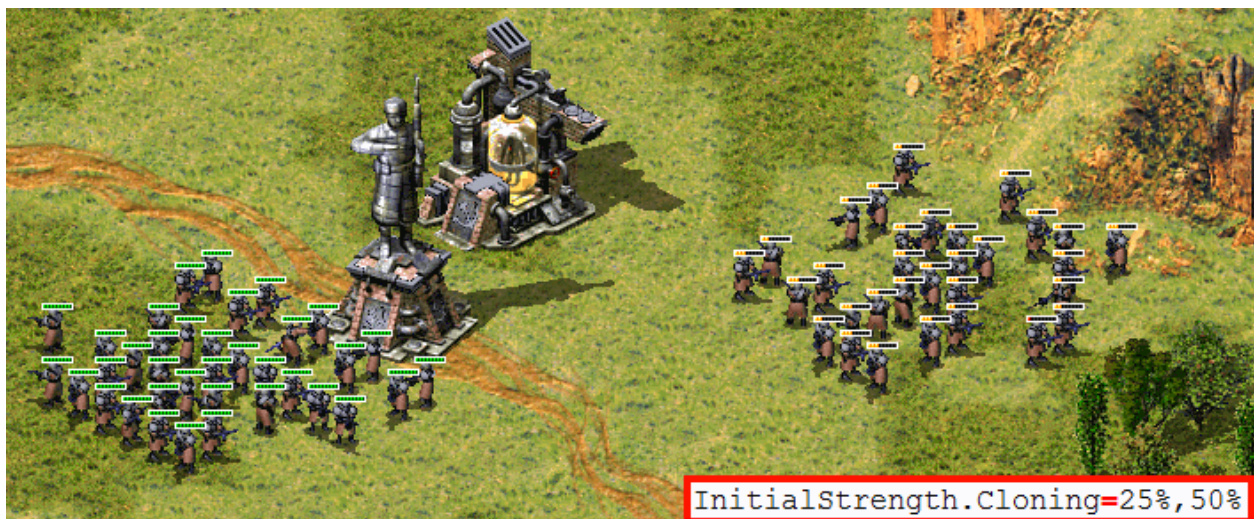
8.7.7 Initial Strength

- You can now specify how many hitpoints a TechnoType starts with.

In `rulesmd.ini`:

```
[SOMETECHNO]         ; TechnoType
InitialStrength=  ; integer
```

8.7.8 Initial Strength For Cloned Infantry

Initial strength for cloned infantry example in C&C: Reloaded

- You can now specify how many hitpoints an Infantry Type starts with when leaves a Cloning Structure with `Cloning=yes`.

In `rulesmd.ini`:

```
[SOMEBUILDING]            ; BuildingType
InitialStrength.Cloning=  ; single double/percentage or comma-sep. range
```

Note: Both `InitialStrength` and `InitialStrength.Cloning` never surpass the type's `Strength`, even if your values are bigger than it.

8.7.9 Kill Object Automatically

- Objects can be destroyed automatically if *any* of these conditions is met:
    - `OnAmmoDepletion`: The object will die if the remaining ammo reaches 0.
    - `AfterDelay`: The object will die if the countdown (in frames) reaches 0.
- The auto-death behavior can be chosen from the following:
    - `kill`: The object will be destroyed normally.
    - `vanish`: The object will be directly removed from the game peacefully instead of actually getting killed.
    - `sell`: If the object is a **building** with buildup, it will be sold instead of destroyed.

If this option is not set, the self-destruction logic will not be enabled.

Note: Please notice that if the object is a unit which carries passengers, they will not be released even with the `kill` option. This might change in the future if necessary.

If the object enters transport, the countdown will continue, but it will not self-destruct inside the transport.

In `rulesmd.ini`:

```
[SOMETECHNO]                    ; TechnoType
AutoDeath.Behavior=             ; enumeration (kill | vanish | sell), default not set

AutoDeath.OnAmmoDepletion=no  ; boolean
AutoDeath.AfterDelay=0        ; positive integer
```

8.7.10 Mind Control enhancement

Mind Control Range Limit used in Fantasy ADVENTURE Multiple Mind Control unit auto-releases the first victim in Fantasy ADVENTURE

- Mind controllers now can have the upper limit of the control distance. Tag values greater than 0 will activate this feature.
- Mind controllers with multiple controlling slots can now release the first controlled unit when they have reached the control limit and are ordered to control a new target.
- Allows Warheads to play custom `MindControl.Anim` which defaults to `ControlledAnimationType`.

In `rulesmd.ini`:

```
[SOMETECHNO]                         ; TechnoType
MindControlRangeLimit=-1.0           ; floating point value
MultiMindControl.ReleaseVictim=false ; boolean

[SOMEWARHEAD]                        ; Warhead
MindControl.Anim=                    ; Animation, defaults to ControlledAnimationType
```

8.7.11 No Manual Move

- You can now specify whether a TechnoType is unable to receive move command.

```
[SOMETECHNO]        ; TechnoType
NoManualMove=false  ; boolean
```

8.7.12 Override Uncloaked Underwater attack behavior

Naval underwater behavior in C&C: Reloaded

- Overrides a part of the vanilla YR logic for allowing naval units to use a different weapon if the naval unit is uncloaked.

- Useful if your naval unit have 1 weapon only for underwater and another weapon for surface objects.

In `rulesmd.ini`:

```
[SOMETECHNO]                        ; TechnoType
ForceWeapon.Naval.Decloaked=-1  ; integer. 0 for primary weapon, 1 for secondary weapon,
→-1 to disable
```

8.7.13 Promoted Spawns

Promoted Spawns in Fantasy ADVENTURE

- The spawned units will promote as their owner's veterancy.

In `rulesmd.ini`:

```
[SOMETECHNO]                   ; TechnoType
Promote.IncludeSpawns=false  ; boolean
```

8.7.14 Spawn range limit

Limited pursue range for spawns in Fantasy ADVENTURE

- The spawned units will abort the infinite pursuit if the enemy is out of range. `Spawner.ExtraLimitRange` adds extra pursuit range to the spawned units.

In `rulesmd.ini`:

```
[SOMETECHNO]                   ; TechnoType
Spawner.LimitRange=false   ; boolean
Spawner.ExtraLimitRange=0  ; integer
```

8.7.15 Weapons fired on warping in / out

- It is now possible to add weapons that are fired on a teleporting TechnoType when it warps in or out. They are at the same time as the appropriate animations (`WarpIn` / `WarpOut`) are displayed.

  - `WarpInMinRangeWeapon` is used instead of `WarpInWeapon` if the distance traveled (in leptons) was less than `ChronoRangeMinimum`. This works regardless of if `ChronoTrigger` is set or not. If `WarpInMinRangeWeapon` is not set, it defaults to `WarpInWeapon`.

  - If `WarpInWeapon.UseDistanceAsDamage` is set, `Damage` of `WarpIn(MinRange)Weapon` is overriden by the number of whole cells teleported across.

In `rulesmd.ini`:

```
[SOMETECHNO]                              ; TechnoType
WarpInWeapon=                             ; WeaponType
WarpInMinRangeWeapon=                     ; WeaponType
WarpInWeapon.UseDistanceAsDamage=false    ; boolean
WarpOutWeapon=                            ; WeaponType
```

8.7.16 Customize EVA voice and `SellSound` when selling units

- When a building or a unit is sold, a sell sound as well as an EVA is played to the owner. These configurations have been deglobalized.

  - `EVA.Sold` is used to customize the EVA voice when selling, default to `EVA_StructureSold` for buildings and `EVA_UnitSold` for vehicles.

  - `SellSound` is used to customize the report sound when selling, default to `[AudioVisual]->SellSound`. Note that vanilla game played vehicles' SellSound globally. This has been changed in consistency with buildings' SellSound.

In `rulesmd.ini`:

```
[SOMETECHNO]     ; BuildingType or UnitType
EVA.Sold=        ; EVA entry
SellSound=       ; sound entry
```

8.8 Terrain

8.8.1 Destroy animation & sound

- You can now specify a destroy animation and sound for a TerrainType that are played when it is destroyed.

In `rulesmd.ini`:

```
[SOMETERRAINTYPE]  ; TerrainType
DestroyAnim=       ; Animation
DestroySound=      ; Sound
```

8.9 Warheads

Hint: All new warheads can be used with CellSpread and Ares' GenericWarhead superweapon where applicable.

8.9.1 Break Mind Control on impact

Mind control break warhead being utilized (RA2: Reboot)

- Warheads can now break mind control (doesn't apply to perma-MC-ed objects).

In `rulesmd.ini`:

```
[SOMEWARHEAD]              ; Warhead
RemoveMindControl=false   ; boolean
```

8.9.2 Chance-based extra damage or Warhead detonation / 'critical hits'

- Warheads can now apply additional chance-based damage or Warhead detonation ('critical hits') with the ability to customize chance, damage, affected targets, affected target HP threshold and animations of critical hit.
  - `Crit.Chance` determines chance for a critical hit to occur. By default this is checked once when the Warhead is detonated and every target that is susceptible to critical hits will be affected. If `Crit.ApplyChancePerTarget` is set, then whether or not the chance roll is successful is determined individually for each target.
  - `Crit.ExtraDamage` determines the damage dealt by the critical hit. If `Crit.Warhead` is set, the damage is used to detonate the specified Warhead on each affected target, otherwise the damage is directly dealt based on current Warhead's `Verses` settings.
  - `Crit.Affects` can be used to customize types of targets that this Warhead can deal critical hits against.
  - `Crit.AffectsBelowPercent` can be used to set minimum percentage of their maximum `Strength` that targets must have left to be affected by a critical hit.
  - `Crit.AnimList` can be used to set a list of animations used instead of Warhead's `AnimList` if Warhead deals a critical hit to even one target. If `Crit.AnimList.PickRandom` is set (defaults to `AnimList.PickRandom`) then the animation is chosen randomly from the list.
    * `Crit.AnimOnAffectedTargets`, if set, makes the animation(s) from `Crit.AnimList` play on each affected target *in addition* to animation from Warhead's `AnimList` playing as normal instead of replacing `AnimList` animation.
  - `Crit.SuppressWhenIntercepted`, if set, prevents critical hits from occuring at all if the warhead was detonated from a *projectile that was intercepted*.
  - `ImmuneToCrit` can be set on TechnoTypes to make them immune to critical hits.

In `rulesmd.ini`:

```
[SOMEWARHEAD]                         ; Warhead
Crit.Chance=0.0                       ; floating point value, percents or absolute (0.0-1.
↪0)
Crit.ApplyChancePerTarget=false       ; boolean
Crit.ExtraDamage=0                    ; integer
```

<div align="right">(continues on next page)</div>

```
Crit.Warhead=                        ; Warhead
Crit.Affects=all                     ; list of Affected Target Enumeration␣
↪(none|land|water|empty|infantry|units|buildings|all)
Crit.AffectBelowPercent=1.0          ; floating point value, percents or absolute (0.0-1.
↪0)
Crit.AnimList=                       ; list of animations
Crit.AnimList.PickRandom=            ; boolean
Crit.AnimOnAffectedTargets=false     ; boolean
Crit.SuppressWhenIntercepted=false   ; boolean


[SOMETECHNO]                         ; TechnoType
ImmuneToCrit=no                      ; boolean
```

Warning: If you set `Crit.Warhead` to the same Warhead it is defined on, or create a chain of Warheads with it that loops back to the first one there is a possibility for the game to get stuck in a loop and freeze or crash afterwards.

8.9.3 Custom 'SplashList' on Warheads

- Allows Warheads to play custom water splash animations. See vanilla's Conventional system here. `SplashList.PickRandom` can be set to true to pick a random animation to play from the list.

In `rulesmd.ini`:

```
[SOMEWARHEAD]                ; Warhead
SplashList=<none>            ; list of animations
SplashList.PickRandom=false  ; boolean
```

8.9.4 Detonate Warhead on all objects on map

Warning: While this feature can provide better performance than a large `CellSpread` value, it still has potential to slow down the game, especially if used in conjunction with things like animations, alpha lights etc. Modder discretion and use of the filter keys (`AffectTargets/Houses/Types` etc.) is advised.

- Setting `DetonateOnAllMapObjects` to true allows a Warhead that is detonated by a projectile (for an example, this excludes things like animation `Warhead` and Ares' GenericWarhead superweapon but includes `Crit.Warhead` and animation `Weapon`) and consequently any `Airburst/ShrapnelWeapon` that may follow to detonate on each object currently alive and existing on the map regardless of its actual target, with optional filters. Note that this is done immediately prior Warhead detonation so after `PreImpactAnim` *(Ares feature)* has been displayed.

  - `DetonateOnAllMapObjects.AffectTargets` is used to filter which types of targets (TechnoTypes) are considered valid and must be set to a valid value other than `none` for this feature to work. Only `none`, `all`, `aircraft`, `buildings`, `infantry` and `units` are valid values. This is set to `none` by default as inclusion of all object types can be performance-heavy.

  - `DetonateOnAllMapObjects.AffectHouses` is used to filter which houses targets can belong to be considered valid and must be set to a valid value other than `none` for this feature to work. Only applicable if

the house that fired the projectile is known. This is set to `none` by default as inclusion of all houses can be performance-heavy.

- **DetonateOnAllMapObjects.AffectTypes** can be used to list specific TechnoTypes to be considered as valid targets. If any valid TechnoTypes are listed, then only matching objects will be targeted. Note that `DetonateOnAllMapObjects.AffectTargets` and `DetonateOnAllMapObjects.AffectHouses` take priority over this setting.

- **DetonateOnAllMapObjects.IgnoreTypes** can be used to list specific TechnoTypes to be never considered as valid targets.

- **DetonateOnAllMapObjects.RequireVerses**, if set to true, only considers targets whose armor type the warhead has non-zero `Verses` value against as valid. This is checked after all other filters listed above.

In `rulesmd.ini`:

```
[SOMEWARHEAD]                              ; Warhead
DetonateOnAllMapObjects=false             ; boolean
DetonateOnAllMapObjects.AffectTargets=none   ; list of Affected Target Enumeration
↪(none|aircraft|buildings|infantry|units|all)
DetonateOnAllMapObjects.AffectHouses=none    ; list of Affected House Enumeration
↪(none|owner/self|allies/ally|team|enemies/enemy|all)
DetonateOnAllMapObjects.AffectTypes=        ; list of TechnoType names
DetonateOnAllMapObjects.IgnoreTypes=        ; list of TechnoType names
DetonateOnAllMapObjects.RequireVerses=false  ; boolean
```

8.9.5 Generate credits on impact

TransactMoney used in [*Rise of the East*](#) *mod*

- Warheads can now give credits to its owner at impact.

  - **TransactMoney.Display** can be set to display the amount of credits given or deducted. The number is displayed in green if given, red if deducted and will move upwards after appearing.

    * **TransactMoney.Display.AtFirer** if set, makes the credits display appear on firer instead of target. If set and firer is not known, it will display at target regardless.

    * **TransactMoney.Display.Houses** determines which houses can see the credits display.

    * **TransactMoney.Display.Offset** is additional pixel offset for the center of the credits display, by default (0,0) at target's/firer's center.

In `rulesmd.ini`:

```
[SOMEWARHEAD]                              ; Warhead
TransactMoney=0                           ; integer – credits added or subtracted
TransactMoney.Display=false               ; boolean
TransactMoney.Display.AtFirer=false       ; boolean
TransactMoney.Display.Houses=All          ; Affected House Enumeration (none|owner/
↪self|allies/ally|team|enemies/enemy|all)
TransactMoney.Display.Offset=0,0          ; X,Y, pixels relative to default
```

8.9.6 Launch superweapons on impact

- Superweapons can now be launched when a warhead is detonated.

    - `LaunchSW` specifies the superweapons to launch when the warhead is detonated.

    - `LaunchSW.RealLaunch` controls whether the owner who fired the warhead must own all listed superweapons and sufficient fund to support `Money.Amout`. Otherwise they will be launched out of nowhere.

    - `LaunchSW.IgnoreInhibitors` ignores `SW.Inhibitors`/`SW.AnyInhibitor` of each superweapon, otherwise only non-inhibited superweapons are launched.

    - `LaunchSW.IgnoreDesignators` ignores `SW.Designators`/`SW.AnyDesignator` respectively.

Note: For animation warheads/weapons to take effect, `Damage.DealtByInvoker` must be set. Also, due to the nature of some superweapon types, not all superweapons are suitable for launch.

In `rulesmd.ini`:

```
[SOMEWARHEAD]                      ; Warhead
LaunchSW=                          ; list of superweapons
LaunchSW.RealLaunch=true           ; boolean
LaunchSW.IgnoreInhibitors=false    ; boolean
LaunchSW.IgnoreDesignators=true    ; boolean
```

8.9.7 Remove disguise on impact

- Warheads can now remove disguise from disguised infantry such as spies. This will work even if the disguised was acquired by default through `PermaDisguise`.

In `rulesmd.ini`:

```
[SOMEWARHEAD]           ; Warhead
RemoveDisguise=false    ; boolean
```

8.9.8 Reveal map for owner on impact

- Warheads can now reveal the entire map on impact.

    - Reveal only applies to the owner of the warhead.

In `rulesmd.ini`:

```
[SOMEWARHEAD]   ; Warhead
SpySat=false    ; boolean
```

8.9.9 Shroud map for enemies on impact

- Warheads can now shroud the entire map on impact.

- Shroud only applies to enemies of the warhead owner.

In `rulesmd.ini`:

```
[SOMEWARHEAD]  ; Warhead
BigGap=false   ; boolean
```

8.9.10 Trigger specific NotHuman infantry Death anim sequence

- Warheads are now able to trigger specific `NotHuman=yes` infantry `Death` anim sequence using the corresponding tag. It's value represents sequences from `Die1` to `Die5`.

In `rulesmd.ini`:

```
[SOMEWARHEAD]              ; Warhead
NotHuman.DeathSequence=  ; integer (1 to 5)
```

8.10 Weapons

8.10.1 AreaFire target customization

- You can now specify how AreaFire weapon picks its target. By default it targets the base cell the firer is currently on, but this can now be changed to fire on the firer itself or at a random cell within the radius of the weapon's `Range` by setting `AreaFire.Target` to `self` or `random` respectively.

- `AreaFire.Target=self` respects normal targeting rules (Warhead Verses etc.) against the firer itself.

- `AreaFire.Target=random` ignores cells that are ineligible or contain ineligible objects based on listed values in weapon's `CanTarget` & `CanTargetHouses`.

In `rulesmd.ini`:

```
[SOMEWEAPON]          ; WeaponType
AreaFire.Target=base ; AreaFire Target Enumeration (base|self|random)
```

8.10.2 Burst.Delays

- Allows specifying weapon-specific burst shot delays. Takes precedence over the old `BurstDelayX` logic available on VehicleTypes, functions with Infantry & BuildingType weapons (AircraftTypes are not supported due to their weapon firing system being completely different) and allows every shot of `Burst` to have a separate delay instead of only first four shots.

- If no delay is defined for a shot, it falls back to last delay value defined (f.ex `Burst=3` and `Burst.Delays=10` would use 10 as delay for all shots).

- Using `-1` as delay reverts back to old logic (`BurstDelay0-3` for VehicleTypes if available or random value between 3-5 otherwise) for that shot.

In `rulesmd.ini`:

```
[SOMEWEAPON]     ; WeaponType
Burst.Delays=-1  ; integer - burst delays (comma-separated) for shots in order from␣
→first to last.
```

8.10.3 Feedback weapon

FeedbackWeapon used to apply healing aura upon firing a weapon (Project Phantom)

- You can now specify an auxiliary weapon to be fired on the firer itself when a weapon is fired.

    - FireInTransport setting of the feedback weapon is respected to determine if it can be fired when the original weapon is fired from inside OpenTopped=true transport. If feedback weapon is fired, it is fired on the transport. OpenToppedDamageMultiplier is not applied on feedback weapons.

In rulesmd.ini:

```
[SOMEWEAPON]     ; WeaponType
FeedbackWeapon=  ; WeaponType
```

8.10.4 Radiation enhancements

- In addition to allowing custom radiation types, several enhancements are also available to the default radiation type defined in [Radiation], such as ability to set owner & invoker or deal damage against buildings. See *Custom Radiation Types* for more details.

8.10.5 Strafing aircraft weapon customization

Strafing aircraft weapon customization in Project Phantom

- Some of the behavior of strafing aircraft weapons (weapon projectile has ROT below 2) can now be customized.

    - Strafing.Shots controls the number of times the weapon is fired during a single strafe run. Ammo is only deducted at the end of the strafe run, regardless of the number of shots fired. Valid values range from 1 to 5, any values smaller or larger are effectively treated same as either 1 or 5, respectively. Defaults to 5.

    - Strafing.SimulateBurst controls whether or not the shots fired during strafing simulate behavior of Burst, allowing for alternating firing offset. Only takes effect if weapon has Burst set to 1 or undefined. Defaults to false.

In rulesmd.ini:

```
[SOMEWEAPON]                 ; WeaponType
Strafing.Shots=5             ; integer
Strafing.SimulateBurst=false ; boolean
```

8.10.6 Weapon targeting filter

`*Weapon target filter - different weapon used against enemies & allies as well as units & buildings* (Project Phantom)

- You can now specify which targets or houses a weapon can fire at. This also affects weapon selection, other than certain special cases where the selection is fixed.

  - Note that `CanTarget` explicitly requires either `all` or `empty` to be listed for the weapon to be able to fire at cells containing no TechnoTypes.

In `rulesmd.ini`:

```
[SOMEWEAPON]            ; WeaponType
CanTarget=all           ; list of Affected Target Enumeration␣
↪(none|land|water|empty|infantry|units|buildings|all)
CanTargetHouses=all  ; list of Affected House Enumeration (none|owner/self|allies/
↪ally|team|enemies/enemy|all)
```

FIXED / IMPROVED LOGICS

This page describes all ingame logics that are fixed or improved in Phobos without adding anything significant.

9.1 Bugfixes and miscellaneous

- Fixed the bug that GameModeOptions are not correctly saved. For example, `BuildOffAlly` is corrupted after load a save.
- Fixed the bug when reading a map which puts `Preview(Pack)` after `Map` lead to the game fail to draw the preview
- Fixed the bug when retinting map lighting with a map action corrupted light sources.
- Fixed the bug when deploying mindcontrolled vehicle into a building permanently transferred the control to the house which mindcontrolled it.
- Fixed the bug when units are already dead but still in map (for sinking, crashing, dying animation, etc.), they could die again.
- Fixed the bug when cloaked Desolator was unable to fire his deploy weapon.
- Fixed the bug that temporaryed unit cannot be erased correctly and no longer raise an error.
- Fixed `DebrisMaximums` (spawned debris type amounts cannot go beyond specified maximums anymore). Only applied when `DebrisMaximums` values amount is more than 1 for compatibility reasons.
- Fixed building and defense tab hotkeys not enabling the placement mode after `Cannot build here.` triggered and the placement mode cancelled.
- Fixed buildings with `UndeployInto` playing `EVA_NewRallypointEstablished` on undeploying.
- Fixed buildings with `Naval=yes` ignoring `WaterBound=no` to be forced to place onto water.
- Fixed AI Aircraft docks bug when Ares tag `[GlobalControls]` > `AllowParallelAIQueues=no` is set.
- Fixed laser drawing code to allow for thicker lasers in house color draw mode.
- Fixed `DeathWeapon` not detonating properly.
    - Some settings are still ignored like `PreImpactAnim` *(Ares feature)*, this might change in future.
- Fixed the bug when occupied building's `MuzzleFlashX` is drawn on the center of the building when `X` goes past 10.
- Fixed jumpjet units that are `Crashable` not crashing to ground properly if destroyed while being pulled by a `Locomotor` warhead.
- Fixed jumpjet units being unable to turn to the target when firing from a different direction.

- Fixed turreted jumpjet units always facing bottom-right direction when motion stops.

- Fixed jumpjet objects being unable to use `Sensors`.

- Fixed interaction of `UnitAbsorb` & `InfantryAbsorb` with `Grinding` buildings. The keys will now make the building only accept appropriate types of objects.

- Fixed missing 'no enter' cursor for VehicleTypes being unable to enter a `Grinding` building.

- Fixed Engineers being able to enter `Grinding` buildings even when they shouldn't (such as ally building at full HP).

- SHP debris shadows now respect the `Shadow` tag.

- Allowed usage of TileSet of 255 and above without making NE-SW broken bridges unrepairable.

- Added a "Load Game" button to the retry dialog on mission failure.

Side offset voxel turret in Breaking Blue project

- `TurretOffset` tag for voxel turreted TechnoTypes now accepts FLH (forward, lateral, height) values like `TurretOffset=F,L` or `TurretOffset=F,L,H`, which means turret location can be adjusted in all three axes.

- `InfiniteMindControl` with `Damage=1` can now control more than 1 unit.

- Aircraft with `Fighter` set to false or those using strafing pattern (weapon projectile ROT is below 2) now take weapon's `Burst` into accord for all shots instead of just the first one.

- `EMEffect` used for random AnimList pick is now replaced by a new tag `AnimList.PickRandom` with no side effect. (EMEffect=yes on AA inviso projectile deals no damage to units in movement)

- Vehicles using `DeployFire` will now use `DeployFireWeapon` for firing the deploy weapon if explicitly set, if not it behaves like previously (`Primary` if can fire, `Secondary` if not) and respect `FireOnce` setting on weapon

and any stop commands issued during firing. If `FireOnce` is set to true the unit won't accept further deploy commands for number of frames that is equal to whichever is smaller between weapon `ROF` and `[Unload] ->` `Rate` times 900.

- Infantry with `DeployFireWeapon=-1` can now fire both weapons (decided by its target), regardless of deployed or not.

Nod arty keeping target on attack order in C&C: Reloaded

- Vehicle to building deployers now keep their target when deploying with `DeployToFire`.

- Effects like lasers are no longer drawn from wrong firing offset on weapons that use Burst.

- Animations can now be offset on the X axis with `XDrawOffset`.

- `IsSimpleDeployer` units now only play `DeploySound` and `UndeploySound` once, when done with (un)deploying instead of repeating it over duration of turning and/or `DeployingAnim`.

- AITrigger can now recognize Building Upgrades as legal condition.

- `EWGates` and `NSGates` now will link walls like `xxGateOne` and `xxGateTwo` do.

- Fixed the bug when occupied building's `MuzzleFlashX` is drawn on the center of the building when `X` goes past 10.

- Fixed jumpjet units that are `Crashable` not crashing to ground properly if destroyed while being pulled by a `Locomotor` warhead.

- Fixed interaction of `UnitAbsorb` & `InfantryAbsorb` with `Grinding` buildings. The keys will now make the building only accept appropriate types of objects.

- Fixed missing 'no enter' cursor for VehicleTypes being unable to enter a `Grinding` building.

- Fixed Engineers being able to enter `Grinding` buildings even when they shouldn't (such as ally building at full HP).

- Aircraft & jumpjet units are now affected by speed modifiers such as `SpeedAircraft/Infantry/UnitsMult` on `Countries`, `VeteranSpeed` and Crates / AttachEffect (Ares feature).

- Both voxel and SHP vehicle units should now correctly respect custom palette set through `Palette`.

- Weapons fired by EMPulse superweapons without `EMPulse.TargetSelf=true` *(Ares feature)* can now create radiation.

- Setting `RadarInvisible` to true on TerrainTypes now hides them from minimap display.

- Mind control indicator animations will now correctly restore on mind controlled objects when uncloaked.

- Animations from Warhead `AnimList` & `SplashList` etc. as well as animations created through map trigger 41 `Play Anim At` now have the appropriate house set as owner of the animation by default.

- Nuke carrier & payload weapons now respect `Bright` setting on the weapons always when appropriate (previously only payload did and only if Superweapon had `Nuke.SiloLaunch=false` *(Ares feature)*).

- Self-healing pips from `InfantryGainSelfHeal` & `UnitsGainSelfHeal` now respect unit's `PixelSelectionBracketDelta` like health bar pips do.

- Buildings using `SelfHealing` will now correctly revert to undamaged graphics if their health is restored back by self-healing.

- Allow use of `Foundation=0x0` on TerrainTypes without crashing for similar results as for buildings.

- Projectiles now remember the house of the firer even if the firer is destroyed before the projectile detonates. Does not currently apply to some Ares-introduced Warhead effects like EMP.

- `OpenTopped` transports now take `OpenTransportWeapon` setting of passengers into consideration when determining weapon range used for threat scanning and approaching targets.

- Trailer animations now inherit the owner of the object (animation, projectile or aircraft) they are attached to.

- Buildings now correctly use laser parameters set for Secondary weapons instead of reading them from Primary weapon.

- Fixed an issue that caused vehicles killed by damage dealt by a known house but without a known source TechnoType (f.ex animation warhead damage) to not be recorded as killed correctly and thus not spring map trigger events etc.

Animated trees used in Ion Shock

- `IsAnimated`, `AnimationRate` and `AnimationProbability` now work on TerrainTypes without `SpawnsTiberium` set to true.

- Fixed transports recursively put into each other not having a correct killer set after second transport when being killed by something.
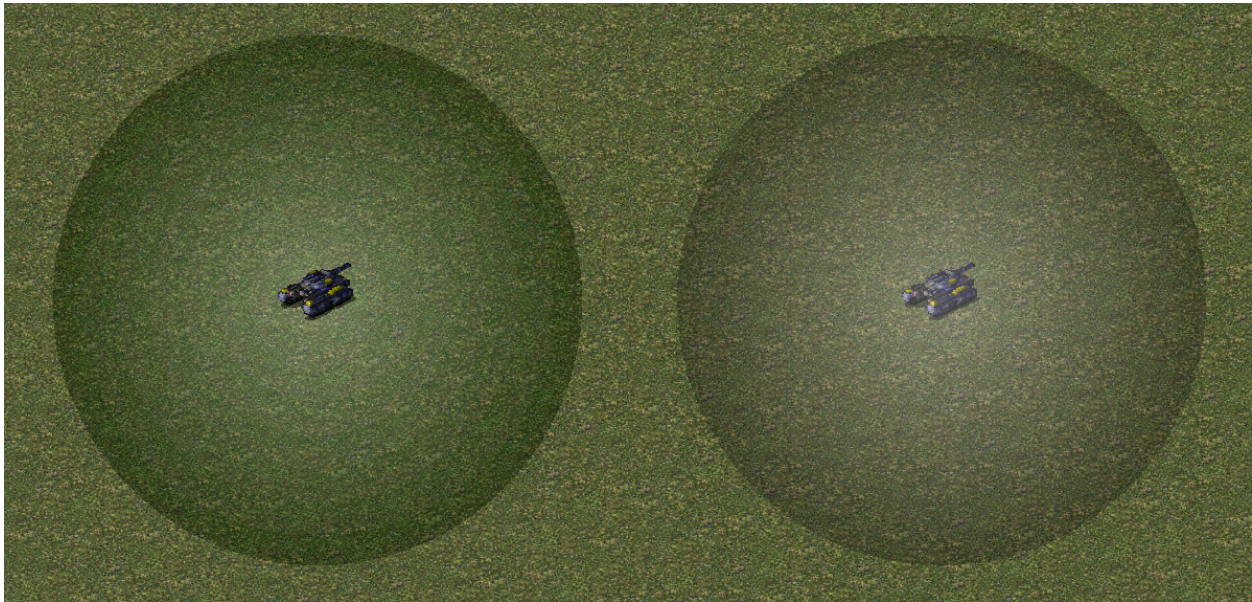
Example gradient SHP drawing with 75% translucency, before and after

- Translucent RLE SHPs will now be drawn using a more precise and performant algorithm that has no green tint and banding. Can be disabled with `rulesmd.ini->[General]->FixTransparencyBlitters=no`.

  - Only applies to Z-aware drawing mode for now.

- Fixed projectiles with `Inviso=true` suffering from potential inaccuracy problems if combined with `Airburst=yes` or Warhead with `EMEffect=true`.

- Fixed the bug when `MakeInfantry` logic on BombClass resulted in `Neutral` side infantry.

- Fixed railgun particles being drawn to wrong coordinate against buildings with non-default `TargetCoordOffset` or when force-firing on bridges.

- Fixed building `TargetCoordOffset` not being taken into accord for several things like fire angle calculations and target lines.

9.2 Animations

9.2.1 Animation weapon and damage settings

- `Weapon` can be set to a WeaponType, to create a projectile and immediately detonate it instead of simply dealing `Damage` by `Warhead`. This allows weapon effects to be applied.

- `Damage.Delay` determines delay between two applications of `Damage`. Requires `Damage` to be set to 1.0 or above. Value of 0 disables the delay. Keep in mind that this is measured in animation frames, not game frames. Depending on `Rate`, animation may or may not advance animation frames on every game frame.

- `Damage.DealtByInvoker`, if set to true, makes any `Damage` dealt to be considered as coming from the animation's invoker (f.ex, firer of the weapon if it is Warhead `AnimList/SplashList` animation, the destroyed vehicle if it is `DestroyAnim` animation or the object the animation is attached to). Does not affect which house the `Damage` dealt by `Warhead` is dealt by.

- `Damage.ApplyOncePerLoop`, if set to true, makes `Damage` be dealt only once per animation loop (on single loop animations, only once, period) instead of on every frame or intervals defined by `Damage.Delay`. The frame on which it is dealt is determined by `Damage.Delay`, defaulting to after the first animation frame.

In `artmd.ini`:

```
[SOMEANIM]                       ; AnimationType
Weapon=                          ; WeaponType
Damage.Delay=0                   ; integer, animation frames
Damage.DealtByInvoker=false      ; boolean
Damage.ApplyOncePerLoop=false    ; boolean
```

Note: `Weapon` and `Damage.Delay`, beyond the other additions, should function similarly to the equivalent features introduced by Ares and take precedence over them if Phobos is used together with Ares.

9.2.2 Attached animation position customization

- You can now customize whether or not animations attached to objects are centered at the object's actual center rather than the bottom of their top-leftmost cell (cell #0).

In `artmd.ini`:

```
[SOMEANIM]                         ; AnimationType
UseCenterCoordsIfAttached=false    ; boolean
```

9.2.3 Layer on animations attached to objects

- You can now customize whether or not animations attached to objects follow the object's layer or respect their own `Layer` setting. If this is unset, attached animations use `ground` layer.

In `artmd.ini`:

```
[SOMEANIM]               ; AnimationType
Layer.UseObjectLayer=    ; boolean
```

9.2.4 Ore stage threshold for `HideIfNoOre`

- You can now customize which growth stage should an ore/tiberium cell have to have animation with `HideIfNoOre` displayed. Cells with growth stage less than specified value won't allow the anim to display.

In `artmd.ini`:

```
[SOMEANIM]                  ; AnimationType
HideIfNoOre.Threshold=0   ; integer, minimal ore growth stage
```

9.3 Buildings

9.3.1 Customizable & new grinder properties

Using ally grinder, restricting to vehicles only and refund display ([Project Phantom](#))

- You can now customize which types of objects a building with `Grinding` set can grind as well as the grinding sound.

  - `Grinding.AllowAllies` changes whether or not to allow units to enter allies' buildings.
  - `Grinding.AllowOwner` changes whether or not to allow units to enter your own buildings.
  - `Grinding.AllowTypes` can be used to define InfantryTypes and VehicleTypes that can be grinded by the building. Listing any will disable grinding for all types except those listed.
  - `Grinding.DisallowTypes` can be used to exclude InfantryTypes or VehicleTypes from being able to enter the grinder building.
  - `Grinding.Sound` is a sound played by when object is grinded by the building. If not set, defaults to `[AudioVisual]->EnterGrinderSound`.
  - `Grinding.Weapon` is a weapon fired at the building & by the building when it grinds an object. Will only be fired if at least weapon's `ROF` amount of frames have passed since it was last fired.
  - `Grinding.DisplayRefund` can be set to display the amount of credits acquired upon grinding on the building. Multiple refunded objects within a short period of time have their refund amounts coalesced into single display.

    * `Grinding.DisplayRefund.Houses` determines which houses can see the credits display.
    * `Grinding.DisplayRefund.Offset` is additional pixel offset for the center of the credits display, by default (0,0) at building's center.

In `rulesmd.ini`:

```
[SOMEBUILDING]                       ; BuildingType
Grinding.AllowAllies=false           ; boolean
Grinding.AllowOwner=true             ; boolean
Grinding.AllowTypes=                 ; List of InfantryTypes / VehicleTypes
Grinding.DisallowTypes=              ; List of InfantryTypes / VehicleTypes
Grinding.Sound=                      ; Sound
Grinding.Weapon=                     ; WeaponType
Grinding.DisplayRefund=false         ; boolean
Grinding.DisplayRefund.Houses=All    ; Affected House Enumeration (none|owner/self|allies/
→ally|team|enemies/enemy|all)
Grinding.DisplayRefund.Offset=0,0    ; X,Y, pixels relative to default
```

9.4 Projectiles

9.4.1 Customizable projectile gravity

- You can now specify individual projectile gravity.
  - Setting `Gravity=0` is not recommended as it will cause the projectile to fly backwards and be unable to hit the target which is not at the same height. We suggest to use `Straight` Trajectory instead. See *here*.

In `rulesmd.ini`:

```
[SOMEPROJECTILE]        ; Projectile
Gravity=6.0             ; floating point value
```

9.5 Technos

9.5.1 Building-provided self-healing customization

- It is now possible to set a global cap for the effects of `InfantryGainSelfHeal` and `UnitsGainSelfHeal` by setting `InfantryGainSelfHealCap` & `UnitsGainSelfHealCap` under `[General]`, respectively.

- It is also possible to change the pip frames displayed from `pips.shp` individually for infantry, units and buildings by setting the frames for infantry & unit self-healing on `Pips.SelfHeal.Infantry/Units/Buildings` under `[AudioVisual]`, respectively.
  - `Pips.SelfHeal.Infantry/Units/Buildings.Offset` can be used to customize the pixel offsets for the displayed pips, individually for infantry, units and buildings.

- Whether or not a TechnoType benefits from effects of `InfantryGainSelfHeal` or `UnitsGainSelfHeal` buildings or neither can now be controlled by setting `SelfHealGainType`.
  - If `SelfHealGainType` is not set, InfantryTypes and VehicleTypes with `Organic` set to true gain self-healing from `InfantryGainSelfHeal`, other VehicleTypes from `UnitsGainSelfHeal` and AircraftTypes & BuildingTypes never gain self-healing.

In `rulesmd.ini`:

```
[General]
InfantryGainSelfHealCap=              ; integer, maximum amount of InfantryGainSelfHeal
↪that can be in effect at once, must be 1 or higher
UnitsGainSelfHealCap=                 ; integer, maximum amount of UnitsGainSelfHeal
↪that can be in effect at once, must be 1 or higher

[AudioVisual]
Pips.SelfHeal.Infantry=13,20          ; integer, frames of pips.shp for infantry & unit-
↪self healing pips, respectively
Pips.SelfHeal.Units=13,20             ; integer, frames of pips.shp for infantry & unit-
↪self healing pips, respectively
Pips.SelfHeal.Buildings=13,20         ; integer, frames of pips.shp for infantry & unit-
↪self healing pips, respectively
Pips.SelfHeal.Infantry.Offset=25,-35  ; X,Y, pixels relative to default
Pips.SelfHeal.Units.Offset=33,-32     ; X,Y, pixels relative to default
Pips.SelfHeal.Buildings.Offset=15,10  ; X,Y, pixels relative to default
```

```
[SOMETECHNO]                          ; TechnoType
SelfHealGainType=                     ; Self-Heal Gain Type Enumeration␣
→(none|infantry|units)
```

9.5.2 Customizable harvester ore gathering animation

Custom ore gathering anims in Project Phantom

- You can now specify which anim should be drawn when a harvester of specified type is gathering specified type of ore.

In `rulesmd.ini`:

```
[SOMETECHNO]                   ; TechnoType
OreGathering.Anims=            ; list of animations
OreGathering.FramesPerDir=15   ; list of integers
OreGathering.Tiberiums=0       ; list of Tiberium IDs
```

9.5.3 Customizable Teleport/Chrono Locomotor settings per TechnoType

Chrono Legionnaire and Ronco using different teleportation settings in YR: New War

- You can now specify Teleport/Chrono Locomotor settings per TechnoType to override default rules values. Unfilled values default to values in `[General]`.

- Only applicable to Techno that have Teleport/Chrono Locomotor attached.

In `rulesmd.ini`:

```
[SOMETECHNO]               ; TechnoType
WarpOut=                   ; Anim (played when Techno warping out)
WarpIn=                    ; Anim (played when Techno warping in)
WarpAway=                  ; Anim (played when Techno chronowarped by chronosphere)
ChronoTrigger=             ; boolean, if yes then delay varies by distance, if no it is a␣
→constant
ChronoDistanceFactor=      ; integer, amount to divide the distance to destination by to␣
→get the warped out delay
ChronoMinimumDelay=        ; integer, the minimum delay for teleporting, no matter how␣
→short the distance
ChronoRangeMinimum=        ; integer, can be used to set a small range within which the␣
→delay is constant
ChronoDelay=               ; integer, delay after teleport for chronosphere
```

9.5.4 Customizable unit image in art

- `Image` tag in art INI is no longer limited to AnimationTypes and BuildingTypes, and can be applied to all TechnoTypes (InfantryTypes, VehicleTypes, AircraftTypes, BuildingTypes).

- The tag specifies **only** the file name (without extension) of the asset that replaces TechnoType's graphics. If the name in `Image` is also an entry in the art INI, **no tags will be read from it**.

- **By default this feature is disabled** to remain compatible with YR. To use this feature, enable it in rules with `ArtImageSwap=true`.

- This feature supports SHP images for InfantryTypes, SHP and VXL images for VehicleTypes and VXL images for AircraftTypes.

In `rulesmd.ini`:

```
[General]
ArtImageSwap=false  ; disabled by default
```

In `artmd.ini`:

```
[SOMETECHNO]
Image=               ; name of the file that will be used as image, without extension
```

9.5.5 Customize resource storage

- Now Ares `Storage` feature can set which Tiberium type from `[Tiberiums]` list should be used for storing resources in structures with `Refinery.UseStorage=yes` and `Storage > 0`.

- This tag can not be used without Ares.

In `rulesmd.ini`:

```
[General]
Storage.TiberiumIndex=-1  ; integer, [Tiberiums] list index
```

9.5.6 Exploding unit passenger killing customization

- By default `Explodes=true` TechnoTypes have all of their passengers killed when they are destroyed. This behaviour can now be disabled by setting `Explodes.KillPassengers=false`.

In `rulesmd.ini`:

```
[SOMETECHNO]                   ; TechnoType
Explodes.KillPassengers=true ; boolean
```

9.5.7 Jumpjet unit layer deviation customization

- Allows turning on or off jumpjet unit behaviour where they fluctuate between `air` and `top` layers based on whether or not their current altitude is equal / below or above `JumpjetHeight` or `[JumpjetControls] -> CruiseHeight` if former is not set on TechnoType. If disabled, airborne jumpjet units exist only in `air` layer. `JumpjetAllowLayerDeviation` defaults to value of `[JumpjetControls] -> AllowLayerDeviation` if not specified.

In `rulesmd.ini`:

```
[JumpjetControls]
AllowLayerDeviation=true        ; boolean

[SOMETECHNO]                    ; TechnoType
JumpjetAllowLayerDeviation=true ; boolean
```

9.5.8 Jumpjet turning to target

Jumpjet turning to target applied in [Robot Storm X](#)

- Allows jumpjet units to face towards the target when firing from different directions. Set `[JumpjetControls] -> TurnToTarget=yes` to enable it for all jumpjet locomotor units. This behavior can be overriden by setting `[UnitType] -> JumpjetTurnToTarget` for specific units.

- This behavior does not apply to `TurretSpins=yes` units for obvious reasons.

In `rulesmd.ini`:

```
[JumpjetControls]
TurnToTarget=false      ; boolean

[SOMEUNITTYPE]          ; UnitType with jumpjet locomotor
JumpjetTurnToTarget=    ; boolean, override the tag in JumpjetControls
```

9.5.9 Kill spawns on low power

- `Powered=yes` structures that spawns aircraft like Aircrafts Carriers will stop targeting the enemy if low power.

- Spawned aircrafts self-destruct if they are flying.

In `rulesmd.ini`:

```
[SOMESTRUCTURE]          ; BuildingType
Powered.KillSpawns=false ; boolean
```

9.5.10 Re-enable obsolete [JumpjetControls]

- Re-enable obsolete [JumpjetControls], the keys in it will be as the default value of jumpjet units.

    - Moreover, added two tags for missing ones.

In `rulesmd.ini`:

```ini
[JumpjetControls]
Crash=5.0        ; floating point value
NoWobbles=false  ; boolean
```

Note: `CruiseHeight` is for `JumpjetHeight`, `WobblesPerSecond` is for `JumpjetWobbles`, `WobbleDeviation` is for `JumpjetDeviation`, and `Acceleration` is for `JumpjetAccel`. All other corresponding keys just simply have no Jumpjet prefix.

9.5.11 Forbid parallel AI queues

- You can now set if specific types of factories do not have AI production cloning issue instead of Ares' indiscriminate behavior of `AllowParallelAIQueues=no`.

    - If `AllowParallelAIQueues=no` (*Ares feature*) is set, the tags have no effect.

In `rulesmd.ini`

```ini
[GlobalControls]
AllowParallelAIQueues=yes               ; must be set yes/true unless you don't use Ares
ForbidParallelAIQueues.Infantry=no  ; boolean
ForbidParallelAIQueues.Vehicle=no   ; boolean
ForbidParallelAIQueues.Navy=no      ; boolean
ForbidParallelAIQueues.Aircraft=no  ; boolean
ForbidParallelAIQueues.Building=no  ; boolean
```

9.6 Terrains

9.6.1 Customizable ore spawners
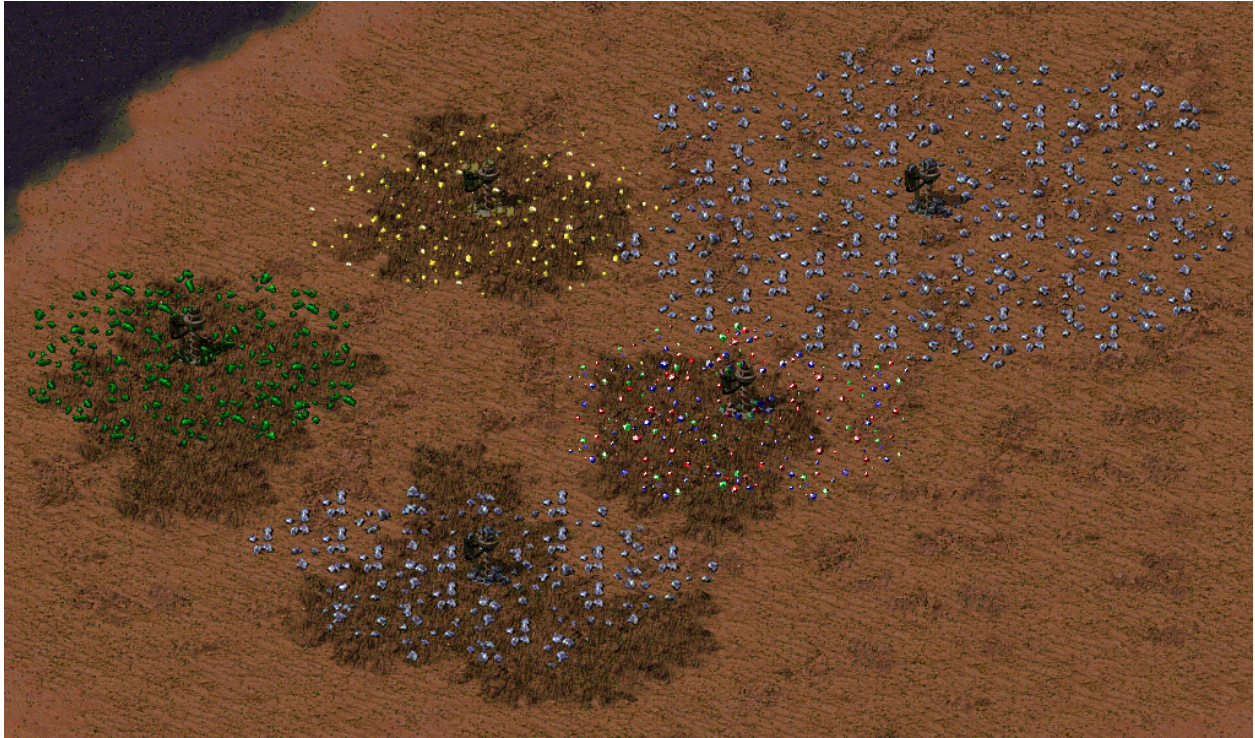
Different ore spawners in Rise of the East mod

- You can now specify which type of ore certain TerrainType would generate.

- It's also now possible to specify a range value for an ore generation area different compared to standard 3x3 rectangle. Ore will be uniformly distributed across all affected cells in a spread range.

- You can specify which ore growth stage will be spawned and how much cells will be filled with ore per ore generation animation. Corresponding tags accept either a single integer value or two comma-separated values to allow randomized growth stages from the range (inclusive).

In `rulesmd.ini`:

```
[SOMETERRAINTYPE]                  ; TerrainType
SpawnsTiberium.Type=0              ; tiberium/ore type index
SpawnsTiberium.Range=1             ; integer, radius in cells
SpawnsTiberium.GrowthStage=3       ; single int / comma-sep. range
SpawnsTiberium.CellsPerAnim=1      ; single int / comma-sep. range
```

9.6.2 Minimap color customization

- TerrainTypes can now be made to display on minimap with different colors by setting `MinimapColor`.

In `rulesmd.ini`:

```
[SOMETERRAINTYPE]  ; TerrainType
MinimapColor=      ; integer - Red,Green,Blue
```

9.6.3 Passable & buildable-upon TerrainTypes

- TerrainTypes can now be made passable or buildable upon by setting `IsPassable` or `CanBeBuiltOn`, respectively.

  - Movement cursor is displayed on `IsPassable` TerrainTypes unless force-firing.

  - `CanBeBuiltOn=true` terrain objects are removed when building is placed on them.

In `rulesmd.ini`:

```
[SOMETERRAINTYPE]   ; TerrainType
IsPassable=false    ; boolean
CanBeBuiltOn=false  ; boolean
```

9.7 Tiberiums (ores)

9.7.1 Minimap color customization

- Ore can now be made to display on minimap with different colors by setting `MinimapColor` on Tiberiums.

In `rulesmd.ini`:

```
[SOMEORE]      ; Tiberium
MinimapColor=  ; integer - Red,Green,Blue
```

9.8 Vehicles

9.8.1 Destroy animations

- `DestroyAnim` has been extended to work with VehicleTypes, with option to pick random animation if `DestroyAnim.Random` is set to true. These animations store owner and facing information for use with *Create-Unit logic*.

In `rulesmd.ini`:

```
[SOMEVEHICLE]                        ; VehicleType
DestroyAnim=                         ; list of animations
DestroyAnim.Random=true              ; boolean
```

9.8.2 IsSimpleDeployer vehicle deploy animation / direction customization

- `DeployingAnim.AllowAnyDirection` if set, disables any direction constraints for deployers with `DeployingAnim` set. Only works for ground units.

- `DeployingAnim.KeepUnitVisible` determines if the unit is hidden while the animation is playing.

- `DeployingAnim.ReverseForUndeploy` controls whether or not the animation is played in reverse for undeploying.

- `DeployingAnim.UseUnitDrawer` controls whether or not the animation is displayed in the unit's palette and team colours or regular animation palette, including a potential custom palette.

In `rulesmd.ini`:

```
[SOMEVEHICLE]                             ; VehicleType
DeployingAnim.AllowAnyDirection=false  ; boolean
DeployingAnim.KeepUnitVisible=false    ; boolean
DeployingAnim.ReverseForUndeploy=true  ; boolean
DeployingAnim.UseUnitDrawer=true       ; boolean
```

9.8.3 Stationary vehicles

- Setting VehicleType `Speed` to 0 now makes game treat them as stationary, behaving in very similar manner to deployed vehicles with `IsSimpleDeployer` set to true. Should not be used on buildable vehicles, as they won't be able to exit factories.

9.8.4 Preserve Iron Curtain status on type conversion

Bugfix in action

- Iron Curtain status is now preserved by default when converting between TechnoTypes via `DeploysInto/UndeploysInto`.

  - This behavior can be turned off per-TechnoType and global basis.

  - `IronCurtain.Modifier` is re-applied upon type conversion.

In `rulesmd.ini`:

```
[CombatDamage]
IronCurtain.KeptOnDeploy=yes ; boolean

[SOMETECHNO]                        ; VehicleType with DeploysInto or BuildingType with
→UndeploysInto
IronCurtain.KeptOnDeploy=    ; boolean, default to [CombatDamage]->IronCurtain.
→KeptOnDeploy
```

9.9 Warheads

9.9.1 Allowing damage dealt to firer

- You can now allow warhead to deal damage (and apply damage-adjacent effects such as `KillDriver` and `DisableWeapons/Sonar/Flash.Duration` *(Ares features)*) on the object that is considered as the firer of the Warhead even if it does not have `DamageSelf=true`.

  - Note that effect of `Psychedelic=true`, despite being tied to damage will still fail to apply on the firer as it does not affect any objects belonging to same house as the firer, including itself.

In `rulesmd.ini`:

```
[SOMEWARHEAD]               ; WarheadType
AllowDamageOnSelf=false   ; boolean
```

9.9.2 Customizing decloak on damaging targets

- You can now specify whether or not the warhead decloaks objects that are damaged by the warhead.

In `rulesmd.ini`:

```
[SOMEWARHEAD]                 ; WarheadType
DecloakDamagedTargets=true   ; boolean
```

9.9.3 Restricting screen shaking to current view

- You can now specify whether or not the warhead can only shake screen (`ShakeX/Ylo/hi`) if it is detonated while visible on current screen view.

In `rulesmd.ini`:

```
[SOMEWARHEAD]         ; WarheadType
ShakeIsLocal=false   ; boolean
```

9.10 Weapons

9.10.1 Customizable disk laser radius

- You can now set disk laser animation radius using a new tag.

In `rulesmd.ini`:

```
[SOMEWEAPON]            ; WeaponType
DiskLaser.Radius=38.2 ; floating point value
                      ; 38.2 is roughly the default saucer disk radius
```

9.10.2 Single-color lasers

Comparison of `IsSingleColor=yes` *lasers with higher thickness to regular ones* (RA2: Reboot)

- You can now set laser to draw using only `LaserInnerColor` by setting `IsSingleColor`, in same manner as `IsHouseColor` lasers do using player's team color. These lasers respect laser thickness. Note that this is not available on prism support weapons.

In `rulesmd.ini`:

```
[SOMEWEAPON]          ; WeaponType
IsSingleColor=false   ; boolean
```

9.10.3 Toggle-able ElectricBolt visuals

EBolt customization utilized for different Tesla bolt weapon usage (RA2: Reboot)

- You can now specify individual ElectricBolt bolts you want to disable. Note that this is only a visual change.

In `rulesmd.ini`:

```
[SOMEWEAPONTYPE]        ; WeaponType
IsElectricBolt=true     ; an ElectricBolt Weapon, vanilla tag
Bolt.Disable1=false     ; boolean
Bolt.Disable2=false     ; boolean
Bolt.Disable3=false     ; boolean
```

9.11 RadialIndicator visibility

In vanilla game, a structure's radial indicator can be drawn only when it belongs to the player. Now it can also be visible to observer. On top of that, you can specify its visibility from other houses.

In `rulesmd.ini`:

```
[AudioVisual]
RadialIndicatorVisibility=allies  ; list of Affected House Enumeration (owner/self |␣
→allies/ally | enemies/enemy | all)
```

AI SCRIPTING AND MAPPING

This page describes all AI scripting and mapping related additions and changes introduced by Phobos.

10.1 Bugfixes and Miscellanous

- Script action `Move to cell` now obeys YR cell calculation now. Using `1000 * Y + X` as its cell value. (was `128 * Y + X` as it's a RA1 leftover)

- The game now can reads waypoints ranges in [0, 2147483647]. (was [0,701])

- Map trigger action `125 Build At...` can now play buildup anim optionally (needs *following changes to* `fadata.ini`.

- Both Global Variables (`VariableNames` in `rulesmd.ini`) and Local Variables (`VariableNames` in map) are now unlimited.

- Script action `Deploy` now has vehicles with `DeploysInto` searching for free space to deploy at if failing to do so at initial location, instead of simply getting stuck.

10.2 Script Actions

10.2.1 `10000-10999` Ingame Actions

`10000-10049` Attack Actions

- These actions instruct the TeamType to use the TaskForce to approach and attack the target specified by the second parameter which is an index of a generic pre-defined group. Look at the tables below for the possible actions (first parameter value) and arguments (the second parameter value).

- For threat-based attack actions `TargetSpecialThreatCoefficientDefault` and `EnemyHouseThreatBonus` tags from `rulesmd.ini` are accounted.

- All aircraft that attack other air units will end the script. This behavior is intentional because without it aircraft had some bugs that weren't fixable at the time of developing the feature.

- `AITargetTypes` actions instruct the TeamType to use the TaskForce to approach and attack the target specified by the second parameter which is an index of a modder-defined group from `AITargetTypess`. Look at the tables below for the possible actions (first parameter value) and arguments (the second parameter value).

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=i,n             ; For i values check the next table
```

Ac-tion	Argument	Re-peats	Target Priority	Description
10000	Target Type#	Yes	Closer	
10001	Target Type#	No	Closer	Ends when a team member kill the designated target
10002	`AITargetTypes` in-dex#	Yes	Closer	
10003	`AITargetTypes` in-dex#	No	Closer	Ends when a team member kill the designated target
10004	`AITargetTypes` in-dex#	Yes	Closer	Picks 1 random target from the list
10005	Target Type#	Yes	Farther	
10006	Target Type#	No	Farther	Ends when a team member kill the designated target
10007	`AITargetTypes` in-dex#	Yes	Farther	
10008	`AITargetTypes` in-dex#	No	Farther	Ends when a team member kill the designated target
10009	`AITargetTypes` in-dex#	Yes	Farther	Picks 1 random target from the list
10010	Target Type#	Yes	Closer, higher threat	
10011	Target Type#	No	Closer, higher threat	Ends when a team member kill the designated target
10012	`AITargetTypes` in-dex#	Yes	Closer, higher threat	
10013	`AITargetTypes` in-dex#	No	Closer, higher threat	Ends when a team member kill the designated target
10014	Target Type#	Yes	Farther, higher threat	
10015	Target Type#	No	Farther, higher threat	Ends when a team member kill the designated target
10016	`AITargetTypes` in-dex#	Yes	Farther, higher threat	
10017	`AITargetTypes` in-dex#	No	Farther, higher threat	Ends when a team member kill the designated target

- The following values are the *Target Type#* which can be used as second parameter of the new attack script actions:

Value	Target Type	Description
1	Anything	Any enemy `VehicleTypes`, `AircraftTypes`, `InfantryTypes` and `BuildingTypes`
2	Structures	Any enemy `BuildingTypes` without `Artillary=yes`, `TickTank=yes`, `ICBMLauncher=yes` o
3	Ore Miners	Any enemy `VehicleTypes` with `Harvester=yes` or `ResourceGatherer=yes`, `BuildingType`
4	Infantry	Any enemy `InfantryTypes`
5	Vehicles	Any enemy `VehicleTypes`, `AircraftTypes`, `BuildingTypes` with `Artillary=yes`, `TickTa`
6	Factories	Any enemy `BuildingTypes` with a Factory= setting

Table 1 – continued from previous page

Value	Target Type	Description
7	Base Defenses	Any enemy `BuildingTypes` with `IsBaseDefense=yes`
8	House Threats	Any object that targets anything of the Team's House or any enemy that is near to the Team Lead
9	Power Plants	Any enemy `BuildingTypes` with positive `Power=` values
10	Occupied	Any `BuildingTypes` with garrisoned infantry
11	Tech Buildings	Any `BuildingTypes` with `Unsellable=yes`, `Capturable=yes`, negative `TechLevel=` values
12	Refinery	Any enemy `BuildingTypes` with `Refinery=yes` or `ResourceGatherer=yes`, `VehicleType:`
13	Mind Controller	Anything `VehicleTypes`, `AircraftTypes`, `InfantryTypes` and `BuildingTypes` with `MindC`
14	Air Units	Any enemy `AircraftTypes`, flying `VehicleTypes` or `InfantryTypes`
15	Naval	Any enemy `BuildingTypes` and `VehicleTypes` with a `Naval=yes`, any enemy `VehicleType`
16	Disruptors	Any enemy objects with positive `InhibitorRange=` values, positive `RadarJamRadius=` values
17	Ground Vehicles	Any enemy `VehicleTypes` without `Naval=yes`, landed `AircraftTypes`, Deployed vehicles in
18	Economy	Any enemy `VehicleTypes` with `Harvester=yes` or `ResourceGatherer=yes`, `BuildingTyp`
19	Infantry Factory	Any enemy `BuildingTypes` with `Factory=InfantryType`
20	Vehicle Factory	Any enemy `BuildingTypes` with with `Naval=no` and `Factory=UnitType`
21	Aircraft Factory	Any enemy `BuildingTypes` with `Factory=AircraftType`
22	Radar	Any enemy `BuildingTypes` with `Radar=yes` or `SpySat=yes`
23	Tech Lab	Any enemy `BuildingTypes` in `[AI]>BuildTech=` list
24	Naval Factory	Any enemy `BuildingTypes` with `Naval=yes` and `Factory=UnitType`
25	Super Weapon	Any enemy `BuildingTypes` with `SuperWeapon=`, `SuperWeapon2=` or `SuperWeapons=`
26	Construction Yard	Any enemy `BuildingTypes` with `ConstructionYard=yes` and `Factory=BuildingType`
27	Neutrals	Any neutral object (Civilian)
28	Generators	Any enemy `BuildingTypes` with `CloakGenerator=yes` or `GapGenerator=yes`
29	Radar Jammer	Any enemy objects with positive `RadarJamRadius=` values
30	Inhibitors	Any enemy objects with positive `InhibitorRange=` values
31	Naval Units	Any enemy `VehicleTypes` with a `Naval=yes` or any enemy `VehicleTypes`, `AircraftTypes`,
32	Mobile Units	Anything `VehicleTypes`, `AircraftTypes` and `InfantryTypes`
33	Capturable	Any `BuildingTypes` with `Capturable=yes` or any `BuildingTypes` with `BridgeRepairHut:`
34	Area Threats	Any enemy object that is inside of the Team Leader's Guard Area
35	Vehicle & Naval Factory	Any enemy `BuildingTypes` with `Factory=UnitType`
36	Non-defensive Structures	Any enemy `BuildingTypes` with `IsBaseDefense=no`

- The second parameter with a 0-based index for the `AITargetTypes` section specifies the list of possible `VehicleTypes`, `AircraftTypes`, `InfantryTypes` and `BuildingTypes` that can be evaluated.

- The *AITargetTypes index#* values are obtained in the new `AITargetTypes` section that must be declared in `rulesmd.ini`:

In `rulesmd.ini`:

```
[AITargetTypes]  ; List of TechnoType lists
0=SOMETECHNOTYPE,SOMEOTHERTECHNOTYPE,SAMPLETECHNOTYPE
1=ANOTHERTECHNOTYPE,YETANOTHERTECHNOTYPE
; ...
```

`10050-10099` Move Team to Techno Location actions

- These actions instructs the TeamType to use the TaskForce to approach the target specified by the second parameter. Look at the tables below for the possible actions (first parameter value).

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=i,n             ; For i values check the next table
```

Ac-tion	Argument	Target Owner	Target Priority	Description
10050	Target Type#	Enemy	Closer, higher threat	
10051	[AITargetType] index#	Enemy	Closer, higher threat	
10052	[AITargetType] index#	Enemy	Closer	Picks 1 random target from the selected list
10053	Target Type#	Friendly	Closer	
10054	[AITargetType] index#	Friendly	Closer	
10055	[AITargetType] index#	Friendly	Closer	Picks 1 random target from the selected list
10056	Target Type#	Enemy	Farther, higher threat	
10057	[AITargetType] index#	Enemy	Farther, higher threat	
10058	[AITargetType] index#	Enemy	Farther	Picks 1 random target from the selected list
10059	Target Type#	Friendly	Farther	
10060	[AITargetType] index#	Friendly	Farther	
10061	[AITargetType] index#	Friendly	Farther	Picks 1 random target from the selected list

`10000-10049` General Purpose

`10100` Timed Area Guard

- Puts the TaskForce into Area Guard mode for the given units of time. Unlike the original timed Guard script action (`5,n`) that just stays in place doing a basic guard operation this action has a more active role attacking nearby invaders or defending units that needs protection.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=10100,n         ; integer, time in ingame seconds
```

`10101` Wait Until Ammo is Full

- If the TaskForce contains unit(s) that use ammo then the the script will not continue until all these units have fully refilled the ammo.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]   ; ScriptType
x=10101,0
```

`10102` Regroup Temporarily Around the Team Leader

- Puts the TaskForce into Area Guard mode for the given amount of time around the Team Leader (this unit remains almost immobile until the action ends). The default radius around the leader is `[General] > CloseEnough` and the units will not leave that area.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]   ; ScriptType
x=10102,n
```

`10103` Load onto Transports

- If the TaskForce contains unit(s) that can be carried by the transports of the same TaskForce then this action will make the units enter the transports. In single player missions the next action must be "Wait until fully loaded" (`43,0`) or the script will not continue.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]   ; ScriptType
x=10103,0
```

10.2.2 `12000`–`12999` Suplementary/Setup Pre-actions

`12000` Wait if No Target Found

- When executed before a new Attack ScriptType actions like `Generic Target Type Attack` actions and `AITargetTypes Attack` actions the TeamType will remember that must wait 1 second if no target was selected. The second parameter is a positive value that specifies how much retries the Attack will do when no target was found before new Attack ScriptType Action is discarded & the script execution jumps to the next line. The value `0` means infinite retries.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]   ; ScriptType
x=12000,n            ; integer n=0
```

12001 Modify Target Distance

- By default `Moving Team to techno location` actions ends when the Team Leader reaches a distance declared in rulesmd.ini called `CloseEnough`. When this action is executed before the actions `Moving Team to techno location` overwrites `CloseEnough` value. This action works only the first time and `CloseEnough` will be used again the next Movement action.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=12001,n
```

12002 Set Move Action End Mode

- Sets how the Movement actions ends and jumps to the next line. This action works only the first time and `CloseEnough` will be used again the next Movement action.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=12002,n
```

- The possible argument values are:

Argument	Action ends when...
0	Team Leader reaches the minimum distance
1	One unit reaches the minimum distance
2	All team members reached the minimum distance

10.2.3 14000–14999 Utility Actions

14000 Team's Trigger Weight Reward

- When executed before a new Attack ScriptType actions like `Generic Target Type Attack` actions and `AITargetTypes Attack` actions the TeamType will remember that must be rewarded increasing the current weight of the AI Trigger when the TeamType Target was killed by any of the Team members. The current weight will never surrpass the minimum weight and maximum weight limits of the AI Trigger. The second parameter is a positive value.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=14000,n          ; integer n=0
```

14001 Increase AI Trigger Current Weight

- When executed this increases the current weight of the AI Trigger. The current weight will never surprass the minimum weight and maximum weight limits of the AI Trigger. Take note that all TeamTypes of the same AI Trigger will update the AI Trigger Current Weight sooner or later. The second parameter is a positive value. Take note that the original game only uses the first of the two Teams for calculating the AI Trigger Current weight at the end of the Trigger life, this action ignores if the Team is the first or the second of the AI Trigger and the Current weight is calculated when is executed the action.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]   ; ScriptType
x=14001,n
```

14002 Decrease AI Trigger Current Weight

- When executed this decreases the current weight of the AI Trigger. Details same as above.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]   ; ScriptType
x=14002,n
```

14003 Unregister Team Success

- Is just the opposite effect of the script action `49,0`. Like if the Team failed.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]   ; ScriptType
x=14003,0
```

10.2.4 16000-16999 Flow Control

16000 Start a Timed Jump to the Same Line

- When the timer ends the current script action ends and start again the same script action. The timer jump repeats again (infinite loop) until is stopped with action `16002` or the team is destroyed.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]   ; ScriptType
x=16000,n           ; integer n=0, in ingame seconds
```

16001 Start a Timed Jump to the Next Line

- When the timer ends the current script action ends and start the next one in the script type list.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=16001,n          ; integer n=0, in ingame seconds
```

16002 Stop the Timed Jumps

- If the Timed Jumps were activated this action stop the process.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=16002,0
```

16003 Randomly Skip Next Action

- When executed this action picks a random value between 1 and 100. If the value is equal or below the second parameter then the next action will be skipped. If the second parameter is 0 means that the next action will never be skipped and 100 means thay always will be skipped.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=16003,n          ; where 0 > n <= 100
```

16004 Pick a Random Script

- When executed this action picks a random Script Type and replaces the current script by the new picked one. The second parameter is a 0-based index from the new section `AIScriptsList` explained below.

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=16004,n
```

The second parameter is a 0-based index for the `AIScriptsList` section that specifies the list of possible `ScriptTypes` that can be evaluated. The new `AIScriptsList` section must be declared in `rulesmd.ini` for making this script work:

In `rulesmd.ini`:

```
[AIScriptsList]  ; List of ScriptType lists
0=SOMESCRIPTTYPE,SOMEOTHERSCRIPTTYPE,SAMPLESCRIPTTYPE
1=ANOTHERSCRIPTTYPE,YETANOTHERSCRIPTTYPE
; ...
```

10.2.5 `18000-18999` Variable Manipulation

`18000-18023` Edit Variable

- Operate a variable's value

- The variable's value type is int16 instead of int32 in trigger actions for some reason, which means it ranges from -2^15 to 2^15-1.

- Any numbers exceeding this limit will lead to unexpected results!

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=i,n            ; where 18000 <= i <= 18023, n is made up of two parts, the low 16␣
↪bits is being used to store the variable index, the high 16 bits is being used for␣
↪storing the param value.
```

`18024 - 18047` Edit Variable using Local Variable

- Operate a variable's value using a local variable's value

- Similar to 18000-18023, but the number to operate the value is being read from a local variable

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=i,n            ; where 18024 <= i <= 18047, n is made up of two parts, the low 16␣
↪bits is being used to store the variable index, the high 16 bits is being used for␣
↪storing the local variable index.
```

`18000 - 18071` Edit Variable using Global Variable

- Operate a variable's value using a global variable's value

- Similar to 18000-18023, but the number to operate the value is being read from a global variable

In `aimd.ini`:

```
[SOMESCRIPTTYPE]  ; ScriptType
x=i,n            ; where 18048 <= i <= 18071, n is made up of two parts, the low 16␣
↪bits is being used to store the variable index, the high 16 bits is being used for␣
↪storing the global variable index.
```

10.2.6 `19000-19999` Miscellanous/Uncategorized

This category is empty for now.

10.3 Trigger Actions

10.3.1 `500` Save Game

- Save the current game immediately (singleplayer game only).

- These vanilla CSF entries will be used: `TXT_SAVING_GAME`, `TXT_GAME_WAS_SAVED` and `TXT_ERROR_SAVING_GAME`.

- The save's description will look like `MapDescName - CSFText`.

- For example: `Allied Mission 25:  Esther's Money - Money Stolen`.

In `mycampaign.map`:

```
[Actions]
...
ID=ActionCount,[Action1],500,4,[CSFKey],0,0,0,0,A,[ActionX]
...
```

10.3.2 `501` Edit Variable

- Operate a variable's value

- The variable's value type is int32, which means it ranges from -2^31 to 2^31-1.

- Any numbers exceeding this limit will lead to unexpected results!

In `mycampaign.map`:

```
[Actions]
...
ID=ActionCount,[Action1],501,0,[VariableIndex],[Operation],[Number],[IsGlobalVariable],0,
↪A,[ActionX]
...
```

Operation	Description
0	CurrentValue = Number
1	CurrentValue = CurrentValue + Number
2	CurrentValue = CurrentValue - Number
3	CurrentValue = CurrentValue * Number
4	CurrentValue = CurrentValue / Number
5	CurrentValue = CurrentValue % Number
6	CurrentValue = CurrentValue leftshift Number
7	CurrentValue = CurrentValue rightshift Number
8	CurrentValue = ~CurrentValue
9	CurrentValue = CurrentValue xor Number
10	CurrentValue = CurrentValue or Number
11	CurrentValue = CurrentValue and Number

10.3.3 `502` Generate random number

- Generate a random integer ranged in [Min, Max] and store it in a given variable

In `mycampaign.map`:

```
[Actions]
...
ID=ActionCount,[Action1],502,0,[VariableIndex],[Min],[Max],[IsGlobalVariable],0,A,
↪[ActionX]
...
```

10.3.4 `503` Print variable value

- Print a variable value to the message list

In `mycampaign.map`:

```
[Actions]
...
ID=ActionCount,[Action1],503,[VariableIndex],0,[IsGlobalVariable],0,0,0,A,[ActionX]
...
```

10.3.5 `504` Binary Operation

- Operate a variable's value with another variable's value
- Similar to 501, but the operation number is read from another variable

In `mycampaign.map`:

```
[Actions]
...
ID=ActionCount,[Action1],504,0,[VariableIndex],[Operation],[VariableForOperationIndex],
↪[IsGlobalVariable],[IsOperationGlobalVariable],A,[ActionX]
...
```

`Operation` can be looked up at action `501`

10.3.6 `505` Fire Super Weapon at specified location

- Launch a Super Weapon from [SuperWeaponTypes] list at a specified location.
- `HouseIndex` can take various values:

House Index	Description
>= 0	The index of the current House in the map
4475-4482	Like in the index range 0-7
-1	Pick a random House that isn't Neutral
-2	Pick the first Neutral House
-3	Pick a random Human Player

- Coordinates X & Y can take possitive values or -1, in which case these values can take a random value from the visible map area.

In `mycampaign.map`:

```
[Actions]
...
ID=ActionCount,[Action1],505,0,0,[SuperWeaponTypesIndex],[HouseIndex],[CoordinateX],
→[CoordinateY],A,[ActionX]
...
```

10.3.7 `506` Fire Super Weapon at specified Waypoint

- Launch a Super Weapon from [SuperWeaponTypes] list at a specified waypoint.

In `mycampaign.map`:

```
[Actions]
...
ID=ActionCount,[Action1],506,0,0,[SuperWeaponTypesIndex],[HouseIndex],[WaypointIndex],0,
→A,[ActionX]
...
```

10.4 Trigger events

10.4.1 `500`–`511` Variable comparation

- Compares the variable's value with given number

In `mycampaign.map`:

```
[Events]
...
ID=EventCount,[Event1],[EVENTID],2,[VariableIndex],[Param],[EventX]
...
```

Event ID	Description	Global
500	CurrentValue > Number	No
501	CurrentValue < Number	No
502	CurrentValue = Number	No
503	CurrentValue >= Number	No
504	CurrentValue <= Number	No
505	CurrentValue & Number	No
506	CurrentValue > Number	Yes
507	CurrentValue < Number	Yes
508	CurrentValue = Number	Yes
509	CurrentValue >= Number	Yes
510	CurrentValue <= Number	Yes
511	CurrentValue & Number	Yes

10.4.2 `512-523` Variable comparation with local variable

- Compares the variable's value with given local variable value

In `mycampaign.map`:

```
[Events]
...
ID=EventCount,[Event1],[EVENTID],2,[VariableIndex],[LocalVariableIndex],[EventX]
...
```

Event ID	Description	Global
512	CurrentValue > LocalVariableValue	No
513	CurrentValue < LocalVariableValue	No
514	CurrentValue = LocalVariableValue	No
515	CurrentValue >= LocalVariableValue	No
516	CurrentValue <= LocalVariableValue	No
517	CurrentValue & LocalVariableValue	No
518	CurrentValue > LocalVariableValue	Yes
519	CurrentValue < LocalVariableValue	Yes
520	CurrentValue = LocalVariableValue	Yes
521	CurrentValue >= LocalVariableValue	Yes
522	CurrentValue <= LocalVariableValue	Yes
523	CurrentValue & LocalVariableValue	Yes

10.4.3 `524-535` Variable comparation with global variable

- Compares the variable's value with given global variable value

In `mycampaign.map`:

```
[Events]
...
ID=EventCount,[Event1],[EVENTID],2,[VariableIndex],[GlobalVariableIndex],[EventX]
...
```

Event ID	Description	Global
524	CurrentValue > GlobalVariableValue	No
525	CurrentValue < GlobalVariableValue	No
526	CurrentValue = GlobalVariableValue	No
527	CurrentValue >= GlobalVariableValue	No
528	CurrentValue <= GlobalVariableValue	No
529	CurrentValue & GlobalVariableValue	No
530	CurrentValue > GlobalVariableValue	Yes
531	CurrentValue < GlobalVariableValue	Yes
532	CurrentValue = GlobalVariableValue	Yes
533	CurrentValue >= GlobalVariableValue	Yes
534	CurrentValue <= GlobalVariableValue	Yes
535	CurrentValue & GlobalVariableValue	Yes

10.4.4 `600` The shield of the attached object is broken

In `mycampaign.map`:

```
[Events]
...
ID=EventCount,...,600,2,0,0,...
...
```

USER INTERFACE

This page lists all user interface additions, changes, fixes that are implemented in Phobos.

11.1 Bugfixes and miscellanous

- Enabled ability to load full-color non-paletted PCX graphics of any bitness. This applies to every single PCX file that is loaded, including the Ares-supported PCX files.

- You can specify custom `gamemd.exe` icon via `-icon` command line argument followed by absolute or relative path to an `*.ico` file (f. ex. `gamemd.exe -icon Resources/clienticon.ico`).

- Fixed `Blowfish.dll`-caused error `***FATAL*** String Manager failed to initialize properly`, which occurred if `Blowfish.dll` could not be registered in the OS, for example, it happened when the player did not have administrator rights. With Phobos, if the game did not find a registered file in the system, it will no longer try to register this file, but will load it bypassing registration.

- Fixed non-IME keyboard input to be working correctly for languages / keyboard layouts that use character ranges other than Basic Latin and Latin-1 Supplement (font support required).

Note: You can use the improved vanilla font which can be found on Phobos supplementaries repo which has way more Unicode character coverage than the default one.
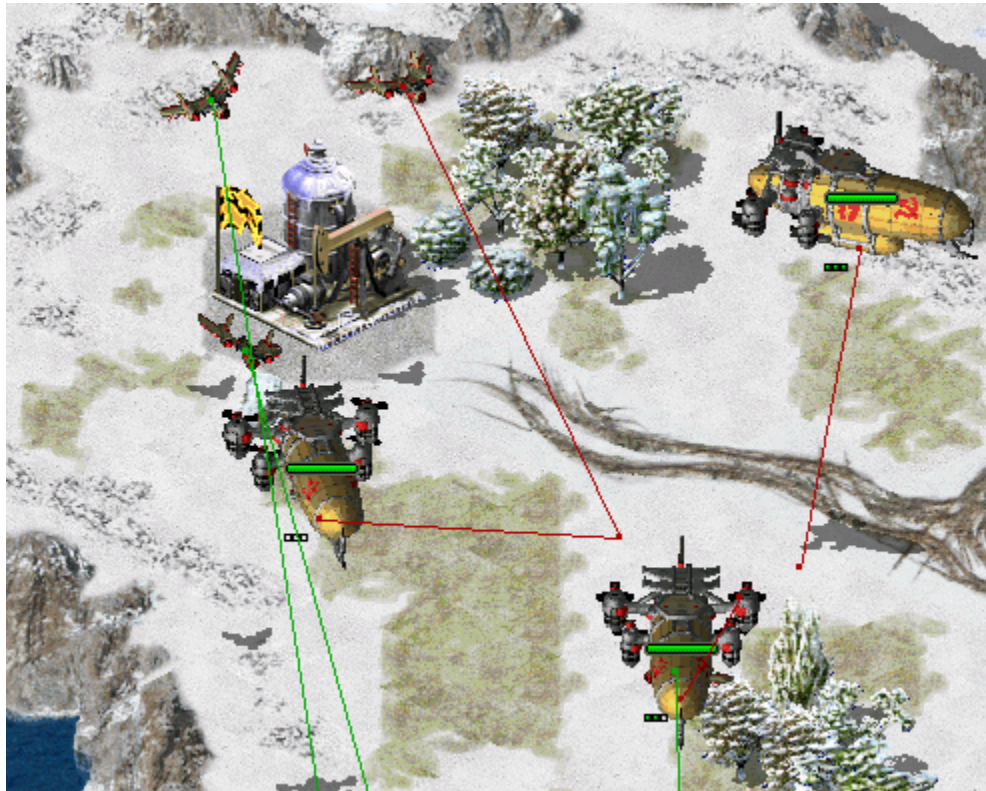
11.2 Audio

- You can now specify which soundtrack themes would play on win or lose.

In `rulesmd.ini`:

```
[SOMESIDE]             ; Side
IngameScore.WinTheme=  ; Soundtrack theme ID
IngameScore.LoseTheme= ; Soundtrack theme ID
```

11.3 Battle screen UI/UX

11.3.1 Hide health bars

Health bars hidden in CnC: Final War

- Health bar display can now be turned off as needed, hiding both the health bar box and health pips.

In `rulesmd.ini`:

```
[SOMENAME]             ; TechnoType
HealthBar.Hide=false   ; boolean
```

11.3.2 Low priority for box selection

Harvesters not selected together with battle units in Rise of the East mod

- You can now set lower priority for an ingame object (currently has effect on units mostly), which means it will be excluded from box selection if there's at least one normal priority unit in the box. Otherwise it would be selected as normal. Works with box+type selecting (type select hotkey + drag) and regular box selecting. Box shift-selection adds low-priority units to the group if there are no normal priority units among the appended ones.
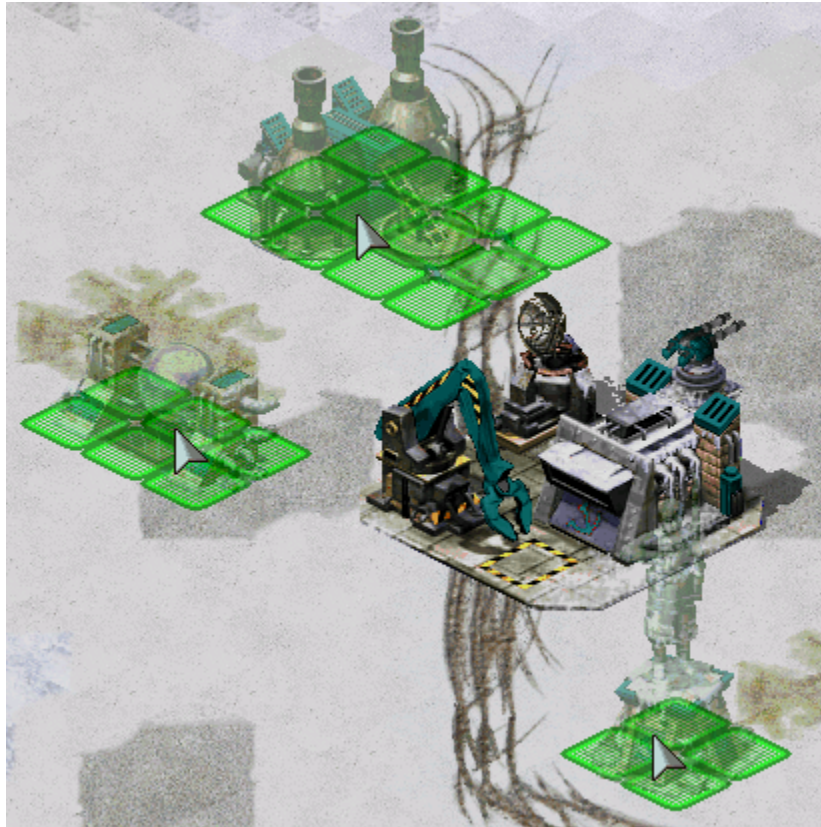
In `rulesmd.ini`:

```
[SOMETECHNO]                ; TechnoType
LowSelectionPriority=false  ; boolean
```

- This behavior is designed to be toggleable by users. For now you can only do that externally via client or manually.

In `RA2MD.ini`:

```
[Phobos]
PrioritySelectionFiltering=true  ; boolean
```

11.3.3 Placement preview

Building placement preview using 50% translucency in [Rise of the East](#)

- Building previews can now be enabled when placing a building for construction. This can be enabled on a global basis with `[AudioVisual]->PlacementPreview` and then further customized for each building with `[SOMEBUILDING]->PlacementPreview`.

- The building placement grid (`place.shp`) translucency setting can be adjusted via `PlacementGrid.Translucency`.

- If using the building's appropriate `Buildup` is not desired, customizations allow for you to choose the exact SHP and frame you'd prefer to show as preview through `PlacementPreview.Shape`, `PlacementPreview.ShapeFrame` and `PlacementPreview.Palette`.

  - You can specify theater-specific palettes and shapes by putting three ~ marks to the theater specific part of the filename. ~~~ is replaced with the theater's three-letter extension.

- `PlacementPreview.ShapeFrame=` tag defaults to building's artmd.ini `Buildup` entry's last non-shadow frame. If there is no 'Buildup' specified it will instead attempt to default to the building's normal first frame (animation frames and bibs are not included in this preview).

In `rulesmd.ini`:

```
[AudioVisual]
PlacementPreview=no                    ; boolean
PlacementPreview.Translucency=75       ; translucency level (0/25/50/75)
PlacementGrid.Translucency=0           ; translucency level (0/25/50/75)

[SOMEBUILDING]
PlacementPreview=yes                    ; boolean
PlacementPreview.Shape=                 ; filename - including the .shp extension. If not␣
↪set uses building's artmd.ini Buildup SHP (based on Building's Image)
PlacementPreview.ShapeFrame=            ; integer, zero-based frame index used for␣
↪displaying the preview
PlacementPreview.Offset=0,-15,1         ; integer, expressed in X,Y,Z used to alter␣
↪position preview
PlacementPreview.Remap=yes              ; boolean, does this preview use player remap colors
PlacementPreview.Palette=               ; filename - including the .pal extension
PlacementPreview.Translucency=          ; translucency level (0/25/50/75), defaults to␣
↪[AudioVisual]->PlacementPreview.Translucency
```

Note: The `PlacementPreview.Palette` option is not used when `PlacementPreview.Remap=yes` is set to yes. This may change in future.

- This behavior is designed to be toggleable by users. For now you can only do that externally via client or manually.

In `ra2md.ini`:

```
[Phobos]
ShowPlacementPreview=yes   ; boolean
```

11.4 Hotkey Commands

11.4.1 [ ] Dump Object Info

- Writes currently hovered or last selected object info in log and shows a message. See *this* for details.

- If need localization, just add `TXT_DUMP_OBJECT_INFO` and `TXT_DUMP_OBJECT_INFO_DESC` into your `.csf` file.

11.4.2 [ ] Next Idle Harvester

- Selects and centers the camera on the next TechnoType that is counted via the *harvester counter* and is currently idle.

- If need localization, just add `TXT_NEXT_IDLE_HARVESTER` and `TXT_NEXT_IDLE_HARVESTER_DESC` into your `.csf` file.

11.4.3 [ ] Quicksave

- Save the current singleplayer game.

- If need localization, just add `TXT_QUICKSAVE`, `TXT_QUICKSAVE_DESC`, `TXT_QUICKSAVE_SUFFIX` and `MSG:NotAvailableInMultiplayer` into your `.csf` file.

  - These vanilla CSF entries will be used: `TXT_SAVING_GAME`, `TXT_GAME_WAS_SAVED` and `TXT_ERROR_SAVING_GAME`.

  - The save should be looks like `Allied Mission 25: Esther's Money - QuickSaved`

11.5 Loading screen

- PCX files can now be used as loadscreen images.

  - You can specify custom loadscreen with Ares tag `File.LoadScreen`.

  - Campaign loading screen (`missionmd.ini`->`[LS800BkgdName]`) can also use PCX image.

  - Observer loading screen can use `ls800obs.pcx` *(or `ls640obs.pcx` when screen width is 640)* for this feature.

- The loadscreen size can now be different from the default `800x600` one; if the image is bigger than the screen it's centered and cropped.

  - This feature works in conjunction with CnCNet5 spawner DLL which resizes loadscreen window to actual monitor size and places the image in center. If there's no CnCNet5 spawner loaded, the window resolution will be always `800x600`.

  - Same applies to campaign loading screen (`missionmd.ini`->`[LS800BkgdName]`).

- You can now disable hardcoded black dots that YR engine shows over empty spawn locations, which allows to use prettier and more correctly placed markers that are produced by Map Renderer instead.

In `uimd.ini`:

```
[LoadingScreen]
DisableEmptySpawnPositions=false  ; boolean
```

11.6 Sidebar / Battle UI

11.6.1 Cameo Sorting

- You can now specify Cameo Priority for any TechnoType/SuperWeaponType. Vanilla sorting rules are here.

  - The Cameo Priority is checked just before evevything vanilla. Greater `CameoPriority` wins.

In `rulesmd.ini`:

```
[SOMENAME]              ; TechnoType / SuperWeaponType
CameoPriority=0         ; integer
```

11.6.2 Custom Missing Cameo (`XXICON.SHP`)

- You can now specify any SHP/PCX file as XXICON.SHP for missing cameo.

In `rulesmd.ini`:

```
[AudioVisual]
MissingCameo=XXICON.SHP  ; filename - including the .shp/.pcx extension
```

11.6.3 Harvester counter

Harvester Counter in Fantasy ADVENTURE

- An additional counter for your active/total harvesters can be added near the credits indicator.

- You can specify which TechnoType should be counted as a Harvester with `Harvester.Counted`. If not set, the techno with `Harvester=yes` or `Enslaves=SOMESLAVE` will be counted.

    - Can be set to true on buildings with `ProduceCashAmount` to count them as active 'harvesters' while generating credits.

- The counter is displayed with the format of `Label(Active Harvesters)/(Total Harvesters)`. The label is U+26CF by default.

- You can adjust counter position by `Sidebar.HarvesterCounter.Offset`, negative means left/up, positive means right/down.

- By setting `HarvesterCounter.ConditionYellow` and `HarvesterCounter.ConditionRed`, the game will warn player by changing the color of counter whenever the active percentage of harvesters less than or equals to them, like HP changing with `ConditionYellow` and `ConditionRed`.

In `uimd.ini`:

```
[Sidebar]
HarvesterCounter.Show=false              ; boolean
HarvesterCounter.Label=<none>            ; CSF entry key
HarvesterCounter.ConditionYellow=99%     ; floating point value, percents
HarvesterCounter.ConditionRed=50%        ; floating point value, percents
```

In `rulesmd.ini`:

```
[SOMETECHNO]                                     ; TechnoType
Harvester.Counted=                               ; boolean

[SOMESIDE]                                        ; Side
Sidebar.HarvesterCounter.Offset=0,0               ; X,Y, pixels relative to default
Sidebar.HarvesterCounter.ColorYellow=255,255,0    ; integer - R,G,B
Sidebar.HarvesterCounter.ColorRed=255,0,0         ; integer - R,G,B
```

Note: If you use the vanilla font in your mod, you can use the improved font (v4 and higher; can be found on Phobos supplementaries repo) which among everything already includes the mentioned icons. Otherwise you'd need to draw them yourself using WWFontEditor, for example.

11.6.4 Power delta counter

Power delta Counter in *Assault Amerika*

- An additional counter for your power delta (surplus) can be added near the credits indicator.

- The counter is displayed with the format of `Label(sign)(Power Delta)`. The label is `PowerLabel` used in `ToolTips` (by default `U+26A1`).

- When the power of the player is blacked-out by a spy or force-shield, `PowerBlackoutLabel` in `ToolTips` is displayed instead (by default `U+26A1 U+274C`), the text color is `Sidebar.PowerDelta.ColorGrey`.

- You can adjust counter position by `Sidebar.PowerDelta.Offset`, negative means left/up, positive means right/down.

- You can adjust counter text alignment by `Sidebar.PowerDelta.Align`, acceptable values are left, right, center/centre.

- By setting `PowerDelta.ConditionYellow` and `PowerDelta.ConditionRed`, the game will warn player by changing the color of counter whenever the percentage of used power exceeds the value (i.e. when drain to output ratio is above 100%, the counter will turn red).

- The exception for this rule is when both power output and drain are 0 - in this case the counter will default to yellow.

In `uimd.ini`:

```
[Sidebar]
PowerDelta.Show=false              ; boolean
PowerDelta.ConditionYellow=75%  ; floating point value, percents
PowerDelta.ConditionRed=100%     ; floating point value, percents
```

In `rulesmd.ini`:

```
[SOMESIDE]                                 ; Side
Sidebar.PowerDelta.Offset=0,0              ; X,Y, pixels relative to default
Sidebar.PowerDelta.ColorGreen=0,255,0     ; integer - R,G,B
Sidebar.PowerDelta.ColorYellow=255,255,0  ; integer - R,G,B
Sidebar.PowerDelta.ColorRed=255,0,0       ; integer - R,G,B
Sidebar.PowerDelta.ColorGrey=128,128,128  ; integer - R,G,B
Sidebar.PowerDelta.Align=left             ; Alignment enumeration - left | center/centre␣
↪| right
```

Note: If you use the vanilla font in your mod, you can use the improved font (v4 and higher; can be found on Phobos supplementaries repo) which among everything already includes the mentioned icons. Otherwise you'd need to draw them yourself using WWFontEditor, for example.

11.6.5 Producing Progress

Producing Progress bars in Fantasy ADVENTURE

- You can now know your factories' status via sidebar!

- You need to draw your own assets (`tab0xpp.shp`, x is replaced by 0-3) and put them into `sidec0x.mix`.

In `uimd.ini`:

```
[Sidebar]
ProducingProgress.Show=false  ; boolean
```

In `rulesmd.ini`:

```
[SOMESIDE]                          ; Side
Sidebar.ProducingProgress.Offset=0,0  ; X,Y, pixels relative to default
```

11.6.6 Specify Sidebar style

- It's now possible to switch hardcoded sidebar button coords to use GDI sidebar coords by setting `Sidebar.GDIPosition`. Defaults to true for first side, false for all others.

In `rulesmd.ini`:

```
[SOMESIDE]            ; Side
Sidebar.GDIPositions=  ; boolean
```

11.7 Tooltips

Extended tooltips used in CnC: Final War

- Sidebar tooltips can now display extended information about the TechnoType/SWType when hovered over it's cameo. In addition the low character limit is lifted when the feature is enabled via the corresponding tag, allowing for 1024 character long tooltips.

- TechnoType's tooltip would display it's name, cost, power, build time and description (when applicable).

- SWType's tooltip would display it's name, cost, and recharge time (when applicable).

- Extended tooltips don't use `TXT_MONEY_FORMAT_1` and `TXT_MONEY_FORMAT_2`. Instead you can specify cost, power and time labels (displayed before corresponding values) with the corresponding tags. Characters `$` U+0024, U+26A1 and U+231A are used by default.

- Fixed a bug when switching build queue tabs via QWER didn't make tooltips disappear as they should, resulting in stuck tooltips.

- The tooltips can now go over the sidebar bounds to accommodate for longer contents. You can control maximum text width with a new tag (paddings are excluded from the number you specify).

In `uimd.ini`:

```
[ToolTips]
ExtendedToolTips=false      ; boolean
CostLabel=<none>            ; CSF entry key
PowerLabel=<none>           ; CSF entry key
PowerBlackoutLabel=<none>   ; CSF entry key
TimeLabel=<none>            ; CSF entry key
MaxWidth=0                  ; integer, pixels
```

In `rulesmd.ini`:

```
[SOMENAME]               ; TechnoType or SWType
UIDescription=<none>   ; CSF entry key
```

- The descriptions are designed to be toggleable by users. For now you can only do that externally via client or manually.

In `RA2MD.ini`:

```
[Phobos]
ToolTipDescriptions=true  ; boolean
```

Note: Same as with harvester counter, you can download the improved font (v4 and higher; can be found on Phobos supplementaries repo) or draw your own icons.

- The background color and opacity of tooltips can now be customized globally or per side.

In `rulesmd.ini`:

```
[SOMESIDE]
ToolTip.Background.Color=0,0,0       ; integer - R,G,B, defaults to [AudioVisual]->
↪ToolTip.Background.Color, which defaults to `0,0,0`
ToolTip.Background.Opacity=100       ; integer, ranged in [0, 100], defaults to␣
↪[AudioVisual]->ToolTip.Background.Opacity, which defaults to `100`
ToolTip.Background.BlurSize=0.0      ; float, defaults to [AudioVisual]->ToolTip.
↪Background.BlurSize, which defaults to `0.0`
```

Note: The blur effect is resource intensive. Please make sure you really want to enable this effect, otherwise leave it to 0.0 so it stays disabled.

In `RA2MD.ini`:

```
[Phobos]
ToolTipBlur=false  ; boolean, whether the blur effect of tooltips will be enabled.
```

MISCELLANOUS

This page describes every change in Phobos that wasn't categorized into a proper category yet.

12.1 Developer tools

12.1.1 Dump Object Info

Object info dump from CnC: Reloaded

- There's a new hotkey to dump selected/hovered object info on press. Available only if `DebugKeysEnabled` under `[GlobalControls]` is set to true in `rulesmd.ini`.

12.1.2 Display Damage Numbers

- There's a new hotkey to show exact numbers of damage dealt on units & buildings. The numbers are shown in red (blue against shields) for damage, and for healing damage in green (cyan against shields). They are shown on the affected units and will move upwards after appearing. Available only if `DebugKeysEnabled` under `[GlobalControls]` is set to true in `rulesmd.ini`.

12.1.3 Frame Step In

- There's a new hotkey to execute the game frame by frame for development usage.

  - You can switch to frame by frame mode and then use frame step in command to forward 1, 5, 10, 15, 30 or 60 frames by one hit.

12.1.4 Semantic locomotor aliases

- It's now possible to write locomotor aliases instead of their CLSIDs in the `Locomotor` tag value. Use the table below to find the needed alias for a locomotor.

Alias	*CLSID*
Drive	`{4A582741-9839-11d1-B709-00A024DDAFD1}`
Jumpjet	`{92612C46-F71F-11d1-AC9F-006008055BB5}`
Hover	`{4A582742-9839-11d1-B709-00A024DDAFD1}`
Rocket	`{B7B49766-E576-11d3-9BD9-00104B972FE8}`
Tunnel	`{4A582743-9839-11d1-B709-00A024DDAFD1}`
Walk	`{4A582744-9839-11d1-B709-00A024DDAFD1}`
DropPod	`{4A582745-9839-11d1-B709-00A024DDAFD1}`
Fly	`{4A582746-9839-11d1-B709-00A024DDAFD1}`
Teleport	`{4A582747-9839-11d1-B709-00A024DDAFD1}`
Mech	`{55D141B8-DB94-11d1-AC98-006008055BB5}`
Ship	`{2BEA74E1-7CCA-11d3-BE14-00104B62A16C}`

PHOBOS

...is a community engine extension project providing a set of new features and fixes for Yuri's Revenge based on modified YRpp and Syringe to allow injecting code. It's meant to accompany Ares rather than replace it, thus it won't introduce incompatibilities.

While Phobos is independent of Ares and does NOT require Ares specifically to function, Phobos complements some of the features found in Ares and vice versa.

You can discuss the project at a dedicated channel on C&C Mod Haven.

13.1 Downloads

You can choose one of the following:

- Latest stable branch build (most bug-free release but very slow on new features)

- Latest development branch builds (a bit less bug-free releases, devbuilds get new features when they are finished)

- Latest development branch nightly (added unreleased features that will be in next devbuild)

- Individual new feature nightly builds for testing can be found in pull requests

13.1.1 Note on nightly builds

Last two listed versions are bleeding edge (don't redistribute them outside of testing!) and have build information (commit and branch/tag) in them which is displayed ingame and can't be turned off. You can get a build for development branch (link above) any up-to-date pull request via an automatic bot comment that would appear in it and would contain the most recent successfully compiled version of Phobos for that feature branch. Please note that the build is produced *only if the PR has no merge conflicts*. Alternatively, you can get an artifact manually from GitHub Actions runs. You can get an artifact for a specific commit which is built automatically with a GitHub Actions workflow, just press on a green tick, open the workflow, find and download the build artifact. This is limited to authorized users only.

13.2 Installation and Usage

1. If you don't have Syringe installed into your mod already, you can download it together with the latest Ares package. To install simply drop `Syringe.exe` into your game folder (where your `gamemd.exe` is located). It's highly recommended to **install Ares** too to get full Phobos feature set, just drop all the files from the archive except documentation folder into your game folder.

2. Obtain a Phobos "package" (official builds can be found on releases page; read below to learn how to get nightly builds). You should end up with two files: `Phobos.dll` and `Phobos.pdb`.

3. Place those files in the game folder (where your `gamemd.exe` is located).

4. To launch the game with Phobos (and all other installed Syringe-compatible engine extensions including Ares) you need to execute `Syringe.exe "gamemd.exe" [command line arguments for gamemd.exe]` in command line (omit arguments if you don't need any). `RunAres.bat` from Ares package does the same so you may use that as well.

If you already use Ares in your mod, you just need to drop Phobos files mentioned above in your game folder, Syringe will load Phobos automatically. This also applies to mods using XNA client with Syringe; if your mod doesn't use Syringe and Ares (or you just haven't set up the client) yet we recommend to use CnCNet client mod base by Starkku which is compatible with Ares and Phobos out of the box.

Additional files and tools that you may need are located at Phobos supplementaries repo.

By default Phobos doesn't do any very noticeable changes except a few bugfixes. To learn how to use Phobos features head over to official documentation.

13.3 Documentation

- Official docs (also available in Chinese)

You can switch between versions (displays latest develop nightly version by default) in the bottom left corner, as well as download a PDF version.

The documentation is split by a few major categories, each represented with a page on the sidebar. Each page has its contents grouped into multiple subcategories, be it buildings, technotypes, infantries, superweapons or something else.

13.3.1 How to read code snippets

```
; which section the entries should be in
; can be a freeform name - in this case the comment would explain what it is
; if no comment to be found - then it's a precise name
[SOMENAME]          ; BuildingType
; KeyName=DefaultValue ; accepted type with optional explanation
; if there's nothing to the right of equals sign - the default value is empty/absent
; if the default value is not static - it's written and explained in a comment
UIDescription=<none> ; CSF entry key
```

13.4 Building manually

1. Install **Visual Studio** (2019 is recommended, 2017 is minimum) with the dependencies listed in `.vsconfig` (it will prompt you to install missing dependences when you open the project, or you can run VS installer and import the config). If you prefer to use **Visual Studio Code** you may install **VS Build Tools** with the dependencies from `.vsconfig` instead. Not using a code editor or IDE and building via **command line scripts** included with the project is also an option.

2. Clone this repo recursively via your favorite git client (that will also clone YRpp).

3. To build the extension:

   - in Visual Studio: open the solution file in VS and build it (`Debug` build config is recommended);

   - in VSCode: open the project folder and hit `Run Build Task...` (`Ctrl + Shift + B`);

   - barebones: run `scripts/build_debug.bat`.

4. Upon build completion the resulting `Phobos.dll` and `Phobos.pdb` would be placed in the subfolder identical to the name of the buildconfig executed.

13.5 Credits

13.5.1 Developers

- **Belonit (Gluk-v48)** - project author
- **Kerbiter (Metadorius)** - project co-author, current maintainer ([Patreon](#))
- **Starkku** - co-maintainer, developer ([Patreon](#))
- **Uranusian (Thrifinesma)** - developer, CN community ambassador ([Patreon](#), [AliPay](#))
- **secsome (SEC-SOME)** - developer
- **Otamaa (Fahroni, BoredEXE)** - developer ([PayPal](#))
- **FS-21** - developer
- **Morton (MortonPL)** - developer
- **Trsdy (chaserli)** - developer

For all contributions see *full credits list*.

Thanks to everyone who uses Phobos, tests changes and reports bugs! You can show your appreciation and help project by displaying the logo (monochrome version can be found here) in your client/launcher (make it open Phobos GitHub page for extra fanciness), linking to Phobos repository, contributing or donating to us via the links above.

13.6 Legal and License

The Phobos project is an unofficial open-source community collaboration project to extend the Red Alert 2 Yuri's Revenge engine for modding and compatibility purposes.

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