Distant Worlds 2

Read me File – 22nd August 2023
Version 1.1.6.5

Welcome.
Thank you for playing Distant Worlds 2™! We are always looking for ways to improve your gaming experience. For the latest information on the game, please go to the [Matrix Games web site](.).

Below you will find the latest and greatest information on Distant Worlds 2™. Information in this document supersedes that in the official game manual.

Troubleshooting:
Ensure that your system meets the minimum system requirements. These are found in the game manual. Also, ensure that you have the latest video and sound drivers available for your system. The vast majority of reported problems are resolved by upgrading all drivers to the latest versions.

If you are still experiencing problems with the game, please use our [Ticket System](.) or post in the Distant Worlds 2 [Support Forum](.). Please provide as much detail on your issue as you can.

To obtain optimum game performance, close all other applications before beginning a game.

IMPORTANT NOTE: If you still experience crashes, please try the new DXVK rendering option in the game settings. This can be found under "Rendering Mode", which can be switched from DirectX 11 to DXVK. DXVK should also be used together with SDR (rather than HDR) for best results. This will likely resolve many issues caused by driver bugs or incompatibilities. If you try this setting and the game does not launch, please note there is a command line option to switch back to DirectX 11. To use add /use-dx11 as a command-line argument to DistantWorlds2.exe.

Change History:

v1.1.6.5 "Discovery" – 22nd August 2023
Please note that for best results, we recommend starting a new game with 1.1.6.5 due to the number of fixes and improvements that won't take full effect without a new start.

CRASH FIXES
- Fixed crash when updating research with repeatable techs
- Fixed crash when retrieving current build order
- Fixed rare crash when starting new game
- Fixed crash when finding mining target within range
- Fixed crash when updating research
- Fixed crash when fleet ship assigns escort mission
- Fixed crash when rendering colony in Selection Panel that gets removed
- Fixed crash when assigning exploration mission to ship
- Fixed crash when repeatable research project contains improved component values for missing component
- Fixed some rare crashes in the Stride engine
- Fixed rare crash when generating ship design name
- Fixed crash when determining whether an empire is a vassal
- Fixed crash when adding items to a location
- Fixed crash when rendering system badges
- Fixed crash when generating galaxy
- Fixed crash when updating research for independents
- Fixed crash in Music System when some audio components are missing
- Fixed crash when loading images
- Fixed crash when determining items in current view
- Fixed Stride bug relating to missing materials when rendering under heavy threading contention
- Fixed rare startup bug relating to dxgi.dll

- Fixed rare startup bug relating to missing CPU core affinity groups
- Fixed rare crash when using Build Order system badges
- Fixed rare crash when loading game
- Fixed rare crash when adding weapon effects to scene

GAME ENGINE
- Upgraded Stride engine to version 4.2.0.1, which means a slight rendering performance improvement and likely fixes some rare crashes
- Fixed game sometimes not starting on some systems with 32 or more CPU cores
- Fixed rare bug when loading a savegame

GRAPHICS IMPROVEMENTS
- Added additional game settings for color adjustment which may help with HDR mode brightness (gamma, brightness, contrast, saturation)
- Fixed very dark HDR rendering mode on some systems
- Improved ambient lighting in Ship Design screen
- Improved display mode selection to prevent issues when using DXVK/Vulkan with multiple monitors
- Improved HDR setup for some systems

HIVE THREAT
The expanded and re-worked Hive threat is now a scaling mid-game threat for all empires to deal with. When the Hive first awakes, after it is encountered and realizes that the galaxy has enough active worlds to sustain it, only the smaller ships will wake up initially and begin raiding and scouting, but over time larger Hive ships will awake and eventually entire Hive Fleets will attempt to raid your inhabited worlds for resources and sustenance.
- Reworked Hive threat to create a more interesting and gradually increasing threat
- Fixed rare situations where Hive threat could wake up earlier than intended
    - Added smaller hive ships in addition to large carriers: there are now Hive frigates and destroyers
    - Hive ships when first discovered are dormant. They will begin to wake up starting with the smallest ships. This is influenced by the discovering player's tech level.
    - Once the first Hive ship has awoken then all other ships progressively wake up over a period of several years
    - Newly woken Hive ships will now band together in fleet to attack targets
    - They will start by attacking pirates, then later faction bases, then finally raiding inhabited worlds
    - They will be placed nearer to empire starting locations
    - The player will now receive periodic sighting messages in Galactic News as various factions spot the Hive fleet
- Fixed The Hive faction showing up in places it should not (e.g. spy mission targets)
- Slowed jump speed of Hive hyperdrive component
- Hive hyperdrives can now be blocked by the first level of HyperDeny

PIRATES
The Pirates are now a bit smarter and better able to defend themselves against early game Empires as well as the early Hive ships. They will no longer always offer Protection when encountered. Some Pirate factions will be friendlier than others and some will need encouragement (gifts) to consider Protection as they would prefer to raid. This makes the Pirates a bit less predictable but also a potentially useful ally to have on your side against the Hive later on.
- Initial pirate first contact incident now decays higher to target value (i.e. reduces upwards towards zero) over time, while still ultimately remaining negative. But makes it easier to get Protection Agreements with pirate factions when have very negative initial encounter
- Implemented brand new pirate cruisers: appearance is dependent on pirate strength in game start settings as outlined below:
    - When Very Strong then some pirate factions may start with a cruiser
    - When Normal or higher: when a non-pirate faction first attacks a pirate base then the pirates will auto-spawn a mostly completed cruiser under construction at their base, which will soon exit the hangar and respond to the attackers

- o When Normal or higher: when have sufficient money, pirate faction may build new cruisers (after initial attack on their base by non-pirates above)
- Decreased ship costs for pirates to encourage ship construction as they gain money from raids
- Changed Pirate Ambush event so that no longer switches abandoned ship to pirate faction with whom the discovering empire already has a protection agreement (which would then be broken)

WEAPON RESEARCH FAMILIES AND AI GUIDANCE

The new preferred Weapon family policy options allow you to guide your automated research and design in a more focused direction.

- Added weapon component families to allow better ship design upgrades and more focused automated research and design. Can specify preferred weapon families for each weapon category in empire policy in the Construction policy sub-section
- Setting your preferred component family for each weapon type will guide ship design automation as well as automated research choices
- Altered some weapon component categories to better optimize AI research pathing
- Rebalanced some of the AI research pathing algorithms
- Added more variation to faction research and design choices via policy files
- Added support for alternate preferred component families per category. Can thus specify fallback preferred families for each weapon category in empire policy
- Improved weapon component selection by preferred weapon families for research and design (more focused on these)

RESEARCH

- Ensure research progress acquired through game events or conquest no longer selects research projects that are not currently visible
- Ensure research breakthroughs always handle all aspects of project (e.g. diplomacy benefits), even when acquired through non-standard means, e.g. salvaging debris, acquiring artifact

REPEATABLE TECHS

The new Repeatable Techs at the end of the tech tree allow you to keep improving the final components in the tree, once you have researched them.

- Added minimum floor for repeatable tech values: cannot fall below 1% of original value (for improvements that have reductive values, e.g. weapon fire rate, energy used)
- Repeatable techs now have repeat count inside top-level icon when already researched once or more
- Project detail for repeatable techs now shows repeat count remaining when approaching limit, when at limit now also properly show 'Final Values' instead of 'Improved Values' (i.e. no next repeat)
- Default size multiplier for repeatable techs is now one, i.e. they do not increase in size/cost with each repeat. Size multiplier value is configurable in ResearchProjectDefinitions.xml
- Fixed component values sometimes not immediately updating when use repeatable techs
- Fixed display values for Static Energy Used in repeatable research projects
- Fixed repeatable research projects to work properly when targets of Steal Tech espionage missions
- Now show improved values (not current) for components/facilities/hulls in repeatable tech project detail
- Fixed incorrect bonus values for Repeatable Ship Hull Techs
- Made all bonuses additive on Repeatable Techs (ShipHullValues.Bonuses, PlanetaryFacilityValues.ItemBonuses, PlanetaryFacilityValues.EmpireBonuses)
- Fixed some display errors when showing project detail for some Repeatable Techs
- Added icon at top-right of research project to indicate that it is a Repeatable Tech
- Ensure that Repeatable Techs that are researched at game startup properly have their research count set to 1
- Implemented Repeatable Techs in Research Screen: level 8 research projects that can be repeatedly researched to improve various aspects of components, facilities and ship hulls
- Currently only have some sample research projects to test with: intercept range improvements to Guardian Defense Grid, troop attack and defense bonuses from Titan Manufacturing Center facility

- Ensure Repeatable Techs also add Weapon Damage Falloff when modifying range

ANCIENT GUARDIAN VAULTS

The new Ancient Guardian Vaults contain ancient knowledge archived by the Ancient Guardians. While the Ancient Guardian story is most closely connected to the Quameno faction, all empires can now discover these faults, figure out how to open them and recover this ancient knowledge and certain ancient artifacts.

When the galaxy is generated, a variable number of Ancient Guardian Vault ruins will be scattered throughout the galaxy. These require specific research projects to open, but have valuable research bonuses and contain rare empire-boosting artifacts.

GALAXY SETUP AND GENERATION

- Added multiple options for toggling default events in Start New Game screen. Can enable/disable various items: PreWarp Home system events, abandoned ships and bases, debris fields, gravitic locations and major threats (e.g. Hive)
- Tweaked Caslon abundance levels when generating a new galaxy so that generally higher
- Fixed some government types altering home colony quality (too high) with PreWarp game start (when build startup facility)
- Fixed startup problems due to incorrect GameStartSettings file
- Ensure Shakturi race does not accidentally show up for independent colonies, etc
- All independent colonies now automatically set appropriate suitability (quality) for populated race, even when they are story-generated locations
- Fixed home colony quality sometimes too high when using Harsh homeworld game settings
- Reduced radius of story nebula and storm clouds to minimize chance of overlap with home system locations

EMPIRE AI IMPROVEMENTS

- AI empires can now better detect and attempt to recover from excess maintenance costs that turn cashflow negative (also applies to player empire with appropriate automation settings)
- This can often happen when an important colony is lost through conquest in a war, thus suddenly removing a large portion of empire income
- Faction in this situation will attempt to retire or scrap excess military ships, fleets or troops until cashflow recovers
- Rebalanced automated military ship building amounts to more closely consider current threats, i.e. do not build too many military ships until face threats from other factions

UI IMPROVEMENTS

- Colony Event tooltips now also show end date for event (from Selection Panel and Main View Header)
- Separated Empire Bonuses into their own list under Empire section in Control Center (next to Government section)
- Fixed some empire bonuses sometimes falling off the end of list in Bonuses screen when have race-specific bonuses, e.g. Gizurean population growth rate modifier
- Added new filtering and sorting options for Available Components list in Ship Design screen that include new component families
- Added new filters to the Colonies list to show colonies that require terraforming (quality not at maximum) or have reached maximum terraforming level and should have facility removed
- Disallowed research projects for a race no longer show disallowed race images in tech tree unless they apply to the player race (less visual clutter)
- Ensure New Mining Locations list falls back to make proper use of colonies for build resources if spaceports are missing resources (thus Queue Build buttons are made active)
- Ensure Mining Bonanza home system colony event has proper image
- Fixed some factions having mismatched colors from their selected flag (e.g. Gizurean)
- Empire bonuses are now shown in a separate tab in the empire menu
- Now force immediate update of all empire bonuses when switch government, including ship-specific bonuses like Maintenance Savings
- Added an icon for any active colony events in your empire to the header in the main view. Hover for details of each, click to select colony with event
- Now display fleet targeting level in Selection Panel when have fleet selected

- Improved button text layout in various UI areas
- Fixed Show Me button sometimes not working on advisor messages
- Fixed Show Me button on messages often not working when related ship is in hyperjump
- Fixed repeated construction messages

POPULATION POLICIES
- Greatly reduced extermination rate of extermination population policy
- Colonies that are wiped out due to exterminate population policy (all population eliminated) now automatically transfer any characters or troops of your empire to nearest colony
- Altered diplomatic and reputation impact from Extermination population policy: values are now more immediate and predictable instead of being applied over time, similar to how Slavery policy works

DIPLOMACY AND REPUTATION
- Fixed bug where very low empire reputation could sometimes result in other factions concern over your reputation not being intense enough
- Diplomacy advisors will no longer suggest gifts to independent colonies while they are being invaded (by any faction), even when your diplomatic strategy for them is set to 'Diplomacy leading to peaceful integration'
- Honoring defense treaties no longer incurs reputation penalty from breaking any existing Non Aggression or Defense treaties with war empire

SHIP DESIGN AND RETROFIT
- Fixed recent bug where auto-generated ship and base design names were not progressing (SSP-1, RS-1, etc)
- Fixed ship and base designs not selecting higher levels of Armor (was always using Standard Armor)
- Ship Design screen now shows comprehensive information on Bonuses from Hull and Empire that are relevant to the current design. These bonuses are also included in all values, thus showing current and accurate values for Weapon Range, Weapon Damage, Hyperjump Speed, Shield Recharge Rate, Mining Rate, Maintenance Savings, etc
- When view Ship status by clicking on Design name in Selection Panel, the Ship Design detail screen now properly shows ship values with current bonuses applied (from empire and ship), thus with accurate weapon range, maintenance cost, etc
- Added some missing info to Energy and Defense sections of Ship Design Detail screen
- Fixed ship/base build costs showing differently in Designs List vs Ship Design screen
- Ensure pirate base designs use hull large enough to fit critical components, e.g. mining engine for fuel extraction
- Adjusted ship model scaling to also include vertical size, not just horizontal dimensions

TROOPS AND TROOP GARRISONS
- Improved colony troop garrison logic so that more willing to garrison troops when have high unrest (e.g. soon after colony conquest)
- Improved selection of race-specific fleet templates and army templates (now properly prefer race-specific templates over generic templates)

CONQUEST
- Ensure that when empire is destroyed (last colony conquered) by last colony becoming independent (rebellion) that only freighters become independent ships, other ship and base types removed
- Now clear any generic colony events when conquer a colony (e.g. race-specific events)

THREAT EVALUATION
- Improved strength evaluation and avoidance of dangerous locations with dormant pirate bases

SPACE COMBAT
- Fixed bug where Shields with high resistance could sometimes increase in value when struck by weapons with low damage values (i.e. below resistance level)

ENEMY TARGETS AND THREATS
- Enemy Targets list now properly always shows known strength for targets
- Now include major threats in Enemy Targets list when visible (Hive, Planet Destroyer, etc)

- Fixed problem where dangerous locations were often not being removed after fleets investigated and cleared threats
- Fixed Queue Attack button for Hive ships Now properly queues/un-queues attacks against each hive ship
- Fixed Cancelling Queued Attacks against fleets in Enemy Targets list so that always works properly

FLEET AND SHIP BEHAVIOR
- Automated fleets now more willing to auto-remove damaged ships from fleet when the ship is too far from repair yard to reach in a timely manner (when Fleet Ship Management is automated)
- Fixed bulk transport freighter missions sometimes failing to load adequate cargo
- Ensure independent freighters do not travel too far when fulfilling resource orders
- Fixed high-end hyperdrives sometimes jumping too often, even for short range travel (low jump accuracy values)
- Fixed Explore System ship mission sometimes ending before entire system explored
- Improved automated fleet formation and fleet ship topup so that more willing to add appropriate ships to fleets while still attempting to maintain fleet cohesion by preferring nearby ships
- Fixed ships sometimes getting stuck at edge of galaxy

REFUELLING AND FUEL TANKERS
- Improved selection of refuelling and repair locations for ships: refuel or repair bases must have docking bays, i.e. bases under construction do not qualify until sufficiently built
- Improved how fuel tankers refuel non-fleet ships: more careful to only refuel ships that are beyond range of nearest refuelling point. So will not refuel ships that could otherwise reach refuelling point on their own
- Fixed duplicate fleet names when rendering Fuel Tanker list
- Fixed bug where fuel tankers sometimes did not load fuel from a refuelling point
- Ensure ships do not attempt to auto-refuel if they have no fuel capacity (damaged), instead first assign repair mission

FUEL AND RESOURCE LOGISTICS
- Ensure freighters and other ships properly preserve salvaged resources and offload them when visit colony or spaceport
- Ensure bases not at colonies get their (manually set) resource stock levels fulfilled by cargo deliveries (e.g. fuel) even when they are not mining stations
- Improved mining station construction so that do not overbuild when already met required rate for specific resource. This will reduce the overall number of AI-built mining stations and freighters, thus also lowering overall fuel usage
- Lowered required rate for construction resources to more accurately reflect actual usage
- Now indicate excessive oversupply for resources in New Mining Locations list, thus helping player avoid overbuilding mining stations for resources where supply already meets demand

EXPLORATION
- Fixed exploration map pings sometimes not clearing when location is visited by ship

NEBULAE AND STORMS
- Some nebula effects no longer apply to ships or creatures while hyperjumping: all damage types, shield drain, energy drain, sub-light speed modifier
- Fixed rare nebula pathing issues when assigning fleet missions to destinations inside nebulae

CHARACTERS
- Inspiring Presence and Demoralizing character traits now properly apply to all characters at a location, even other characters with Inspiring Presence or Demoralizing trait when there are more than one character with the trait at the location
- Ensure remove irrelevant character traits when an existing character becomes the new empire leader
- Improved application of character appearance chance bonuses, so that even more likely to get characters of desired roles

PLANETARY FACILITIES
- Significantly reduced costs for all planetary defense facilities

- Colonies will now upgrade planetary facilities when higher facility in same family is available, and when planetary facility construction is automated and can afford
- Ensure Terraforming Facilities are built on colonies even when have no damage (when planetary facility construction is automated)
- Improved management of automated facility funding level so that more likely to have spare maintenance funding to build and upgrade facilities

COLONIZATION AND TERRAFORMING
- Now automatically clear queued colonization when another empire colonizes the target planet
- Reduced natural planet quality damage repair rate for uninhabited planets
- Prevent colony ships from fleeing enemy ships when under construction
- Ensure automated colony ships that need repair or construction completion assign repair mission

SHIP AND BASE CONSTRUCTION
- Improved evaluation of new mining locations so that accurately indicate when target is beyond construction ship fuel range: targets that mine fuel now use extended fuel range (can refuel at new mining station, thus can use full fuel range). Thus do not disable 'Queue Mining Station' button when new target still within fuel range
- Now properly cancel construction ship mission when base being built is attacked and destroyed (e.g. by pirates or space creatures), thus avoiding repeated cycle of rebuilds and consequent drain on private economy
- Fixed faulty construction yard wait time when processing many retiring ships
- Fixed rendering for construction yard list: sometimes not showing all ships under construction in list items
- Cancel construction action button no longer destroys ship waiting in construction queue if retrofitting, repairing or retiring (only destroys ships when constructing anew)

MODDING SUPPORT
- Added support for static Characters (no animations, just a 2D image) defined in the file Characters.xml
  - Define name, race and role
  - Include full set of skills and traits for the character
  - Includes support for character images either from bundles or file paths, or can use full Spine character animations
  - Can specify appearance order so that a defined set of characters show up in expected order
  - Can specify AppearOnlyInFirstEmpireOfRace to ensure that player always gets this character (not other factions of the same race)
- Improved construction ships repairing disabled ships
- Disabled ships that cannot travel for repairs now properly avoid assigning missions they cannot complete
- Ensure fleets properly retrofit (use correct fleet template), even when formed using Create New Fleet button

GAME EVENT FEATURES
- Added new Game Event condition types: EmpireIsNotPlayer, EmpireIsPirate, EmpireIsNotPirate
- Optionally allow some game event actions to suppress any messages (ResearchProgress, ResearchBreakthrough, ResearchProjectEnable)

GAME EDITOR
- Fixed some values not updating in the Game Editor (e.g. Ship fuel levels)

GAME EVENT CHANGES
- Anchored Mortakosh battleship to starting location so that does not roam around the galaxy once awoken
- Changed salvage bonus for Shakturi Debris Field from Firestorm Torpedo tech to system exploration

IKKURO AND DHAYUT DLC
- Model bundle and data fixes for Ikkuro and Dhayut

v1.1.4.4 "Hyperspeed" – 26th May 2023

Please note that for best results, we recommend starting a new game with 1.1.4.4 due to the number of fixes and improvements that won't take full effect without a new start.

<u>*"Hyperspeed" Performance Update*</u>
This update fixes and improves many long-standing issues with gameplay and system compatibility, but the biggest change is a massive increase in game performance, especially with regard to simulating the "living galaxy" in Distant Worlds 2. We've been working behind the scenes for many months to try to fix the most significant performance issues with Distant Worlds 2, which involved making quite a few low level changes which affected just about every area of the game. These changes required a great deal of testing and tweaking to work out all the bugs so that we could maintain the stability of the "Aurora" update combined with the much improved performance of "Hyperspeed". We hope you enjoy these changes and that your DW2 galaxy feels much more alive as a result.

"Hyperspeed" also includes the first round of improvements and fixes for the Factions: Ikkuro and Dhayut DLC. We will be making more improvements, especially to the Damazy/Web of Destiny storyline, in the next round of updates.

CRASH FIXES
- Fixed crash when ship evaluates collision avoidance
- Fixed rare crash when ship is destroyed
- Fixed crash when change camera view from Top Down to Free Form, then to Low/Med/High Angle
- Fixed crash when base processes its docking queue
- Fixed crash when determining empire fuel resources
- Fixed crash when determining excess resources at a location for bulk cargo transport
- Fixed crash when updating map overlays
- Fixed rare crashes when adding or removing character skills or traits
- Fixed crash when repairing ship or base
- Fixed rare crash when selecting random race
- Fixed crash when calculating construction yard wait time
- Fixed crash when calculating ship retrofit cost
- Fixed crash when rendering system badges
- Fixed crash when determining default display adapter when running on Linux via Proton
- Fixed rare crash when evaluating dominant race for a colony population
- Fixed rare crash when calculating population attack strength at invaded colonies
- Fixed various threading issues causing a variety of strange behavior
- Fixed rare crash when ship reviews fleet escort
- Handle rare exceptions when loading character animations
- Fixed crash when lock view on jumping ship while weapon effects are turned off
- Fixed rare crash when updating territory map
- Fixed rare crash when review fleet escort ships
- Fixed crash in Start New Game screen when a playable race has a null description

CRASH LOGGING
- Improved robustness of session log and exception recording

COMPATIBILITY AND GAME SETTINGS
Please read through all the new in-game settings, which should allow you to tailor game performance much more to your liking.
- Added System Load Target setting in game settings, allowing you to limit CPU usage
- Added Maximum FPS setting in game settings, allowing you to limit GPU usage
- Added Vsync as a game setting (enabled by default) which means DW2 will try to match your monitor's refresh rate in terms of actual displayed FPS
- Additional settings to disable texture streaming, particle effects, weapon effects and unit damage overlay are available for players with ongoing performance issues to test to see which may help on a given system

- Texture Streaming is now off by default, can reenable in game settings but DW2 generally performs better with this turned off
- Fixed some display values not being properly remembered in game settings
- Added option for when switch music tracks: when scene changes or when track ends
- Added additional volume settings and fixed an issue which caused problems with the Windows Volume Mixer on some systems
- Split out sound effect volume controls for User Interface and Nebula Storms
- Added configurable nebula rendering density option in game settings, if you still have any performance issues in nebulae, turn this setting down
- Added game setting to disable Nebula Storm scene-wide lightning flashes
- Added configurable background star field density level option in game settings to allow each player to adjust the density of the starfield to their liking
- Added configurable background star field opacity option in game settings to allow each player to adjust the brightness of the starfield to their liking

INSTALLATION ISSUES
- More gracefully handle missing shiphulls or bundles (models) and warn player about need to fix installation
- Fixed installation issue with loading DLC models when purchased from different platform to main game (e.g. Steam vs Matrix), this could cause the DLC factions to not show up in some cases even when installed

VISUAL IMPROVEMENTS
- Tweaked appearance of background starfield, which should eliminate a bad flickering visual effect that was only visible on some kinds of monitors
- Fixed up background starfield fade-out
- Fixed occasional single-frame flash of full-size ship model and engine exhaust on-screen when ship jumps into currently-viewed location
- Ensure deep space locations still have adequate ambient lighting
- Fixed ship symbol system to no longer periodically blink

GRAPHICAL IMPROVEMENTS
- Fixed index issues causing large models to sometimes not load correctly

SOUNDS
- Fixed star and black hole sounds not honoring sound effect volume

PERFORMANCE IMPROVEMENTS
- Massive performance improvements in all areas
- Expanded the Shift-Tilde performance overlay to provide much more information about game performance
- Draw overhead reduced by 75% in worst case scenarios
- Main thread drawing is now rarely or never blocked
- .Net Garbage Collection occurrence on main thread is significantly reduced
- .Net Garbage generation is significantly reduced
- CPU 0 is targeted for drawing, all other work is pushed to other CPU cores except particle effects
- Hitching due to various components of the UI (cashflow, colony approval) are reduced or eliminated
- Background simulation rate significantly increased, potentially more parallelized on higher core counts
- Various improvements to multithreading
- Improved performance when freighters assign bulk transport missions
- Optimized nebula rendering to be more performant
- Fixed some items not being processed in background
- Fixed some systems and locations becoming very slow when have very many debris items

MEMORY MANAGEMENT
- Added precautionary checks when saving SpaceItems (debris, etc) and Trade Offers
- Now more active in removing empty temporary locations after ships and creatures leave them
- Reduced memory usage for nebula path finding

SHIP AND FLEET BEHAVIOR

Fleet behavior improvements in this update are focused on refueling and fleet tanker behavior as well as troop loading and fighter management. You should find far fewer instances of fleets getting stuck waiting for fighters, getting stuck loading troops, running out of fuel or tankers not doing their jobs. We found that most of the remaining major issues related to manually controlled fleets or automated fleets which had manual ships added to them, but the resulting fixes improved fleet behavior across the board.

- Further reduce likelihood of fleets failing to refuel (e.g taking on new attack mission without first refuelling)
- Improved fleet troop loading
- Improved fighters boarding carriers when under heavy load, thus improving fleet responsiveness
- Fleets and other ships now more careful about going to dangerous locations (refuelling, investigating, etc), especially when considering hostile stationary defenses (bases)
- When adding manually-controlled ships to an automated fleet (Role is not Manual) then also change ship to automated. This is necessary to avoid some edge case issues where reinforcing manual ships were not behaving properly within automated fleets.
- Improve fleets sometimes taking on miniscule threats (e.g. civilian ships) when could instead attack major targets (bases & military)
- Further extend threat strength evaluations (now including strength of bases, not just 'mobile' strength) to systems (in addition to locations)
- Fixed bug where fleets would sometimes attack creatures at distant locations
- Tightened fleet formation when most ships in fleet are set to Core (role within fleet)
- Fixed fleets sometimes repeatedly attempting to move to home base when most ships in fleet are set to Core (role within fleet)
- Fixed troop transports sometimes failing to find docking point at colony when loading troops
- Carriers will now slow even further if waiting for slow fighters to board while preparing to jump
- Expanded conditions when fighters are considered stranded and are abandoned (e.g. reactor disabled and thus unable to move fast enough to board moving carrier)

FUEL TANKERS

How should Fuel Tankers work?

- *When fuel tankers are low on fuel they will either load fuel from a refueling point or mine fuel from a nearby fuel source.*
- *When assigned to a fleet, fuel tankers will monitor and refuel fleet ships as needed, while attempting to stay clear of any battles.*
- *When not assigned to a fleet, they will refuel any ship in your empire that needs it, starting with fleets, then other military ships, exploration ships, and all other ships.*
- *When fuel tankers are assigned to a fleet: if the fleet detects that it needs to refuel then it will first check whether it's fuel tankers can completely refuel the fleet. If so, and the tankers are within fuel range, and the fleet location is not too dangerous, then the fleet will signal the fuel tankers to top them up. The fleet will wait at it's current location until the tankers finish refueling them.*
- Improved fleet usage of Fuel Tankers Automated fleets will now signal their automated Fuel Tankers to refuel them when closer than travelling to fixed refuelling point. Fleet will then wait until tankers refuel them. Fuel Tankers must be idle or mining fuel, within range and able to completely refuel fleet (see further info on Fuel Tankers below)
- Improved fleet refuelling - less willing to take on other mission types when fleet ships have low fuel, instead more likely to refuel
- Ensure fuel tankers move with fleets even when fleet is travelling to random point in deep space
- Reduced number of fuel tankers built

RESOURCE LOGISTICS

We found a number of additional issues withe Resource Logistics which could be improved, resulting in another jump in private economy performance with regard to getting resources to where they should be going. This especially improved Caslon distribution. A summary of the key improvements:

1. *More accurate updating of some critical values in high contention threading scenarios (particularly cargo amounts)*
2. *Reduced static energy usage for shields and thus much-improved flow-on effects for ship designs*

(less overall fuel usage, less energy collectors and reactors required, thus more general bays for fuel cells, thus better fuel range)
3. *Better fuel tanker behavior within fleets and better coordination between fleets and fuel tankers*
4. *Better awareness by all fleet ships of event-created threat locations especially with regard to refueling*

- More accurate calculation of some values under high contention threading scenarios
- Better handling of resource reservations when cancel refueling or transport missions in high contention threading scenarios
- Now always set default resource stock level values when planet first colonized, regardless of automation settings
- Fixed bug where reserved cargo would often not be properly utilized
- Tweaked expected Fuel demand level to properly prioritize construction of fuel mining stations and mining ship fuel seeking
- Tweaked resource mining rate when have many resources at a location (more than 5) so that mining rate for each resource remains at reasonable level (not too slow)

COLONIZATION AND MIGRATION
We found and fixed some remaining issues which could result in bad automated decision making regarding suitability for colonization and migration.

- Improved selection of build location for new colony ships - more likely to build at colonies with desired race for colonization target (but build colony must still have adequate construction resources)
- Fixed colony migration sometimes using races with suitability below threshold specified in empire policy (Minimum Suitability)
- Ensure passenger ships load the most suitable race for migration destination from pickup colony (race at pickup colony must either meet load threshold of 500 million population, or have policy set to Resettle)

PLANETARY DEFENSE FACILITIES
Defense facilities were not working as intended, partly due to bugs and partly due to data issues.
Both areas received fixes to ensure your planetary defense facilities are worth their maintenance cost.

- Fixed fighters at colonies (Fighter Bay facility) not being built or launched
- Ensure fighters at colonies (Fighter Base facility) are properly removed when empire destroyed
- Fixed weapon planetary facilities not updating properly when reload savegame
- Fixed weapon planetary facilities so that properly have multiple instances of weapon as defined in PlanetaryFacilityDefinitions.xml. This means most facilities are about 5x more effective than they were previously.
- Improved visibility of planetary defense weapons

SHIELDS
- Reduced static energy requirements for Shield components as this was causing auto-design and fuel issues
- Added new ShieldRechargeEnergyUsage values for Shield components to replace previous increased static energy usage. This will only use energy when the shield is actually recharging. This helps differentiate the high recharge rate shields (which consume more energy) from the high strength shields (which consume less).

EXPLORATION
- Fixed bug where could investigate ruins multiple times when 'Suppress All Messages' enabled in game settings
- Fixed erroneous repeated ruins investigation at colonies when one of the related game events is disabled

RESEARCH
- Ensure always honor EnabledByDefault setting on research projects when generating tech trees for each faction, even for pirates
- Properly exclude disabled research projects from various situations: random exploration tech breakthroughs, etc
- Fixed duplicate research bonuses from research stations at colonies with ruins

DIPLOMACY

- Ensure never get negative tribute income from vassals, there is now a minimum tribute level.

MESSAGES
- Improved some story messages by highlighting bonuses received from event

CONSTRUCTION
- Fixed inability to build another spaceport at a colony if scrap existing spaceport while under construction
- Ensure properly acquire all ships in construction queues when take ownership of ship, base or colony

NEBULAE AND STORMS
- Nebula effects (jump slowdown, damage, etc) no longer apply when a ship is skirting the edge of a nebula cloud. Must now be deeper into nebula before ship will be slowed or damaged. This is a temporary measure to improve some edge cases until a better pathfinding solution can be implemented.

HIVE AND PLANET DESTROYER THREATS
- Improved mission selection for Hive and Planet Destroyer ships - thus more performant and more able to find place to self-repair any damage

UI IMPROVEMENTS
- Added larger step increments for numeric up/down controls (shift-click, ctrl-click, shift-ctrl-click) in areas of the interface that support them
- Provide better UI visibility of storm/nebula/location effects (ion damage, direct damage, jump slowdown, etc...): icon and tooltip in system view summary at bottom-center of screen
- Added horizontal scrolling for Select Your Race step of Start New Game screen to allow for more than 10 races

GAME EDITOR
- Ensure Game Editor is properly exited when Exit to Menu

MODDING AND GAME EVENTS
- Added new GameEventAction condition type to better support story events: EmpireIsPlayer
- Provided better support for static character and race art in Character screen (fixed distortion and ensure have background)

GAME DATA AND BUNDLES
- Various data tweaks, improvements and fixes to components and facilities
- Updated Haakonish ship models with some minor fixes

OTHER
- Fixed potential bug with Assault Pods when loading savegames
- Fixed home colony quality sometimes dropping slightly soon after game start when use Republic or Monarchy government types
- Reduced default victory condition threshold for new games to 60% to ensure most games could reach a victory end state

FACTIONS: IKKURO AND DHAYUT DLC
- Corrections for typos and issues in various story events
- Corrected Dhayut Infantry troop strength
- Fixed Dhayut Resort Base issue
- Fixed Ikkuro Cruiser issues

v1.1.2.4 – 16th March 2023

CRASH FIXES
- Fixed various rare crashes
- Fixed rare crash when ship resolves mission commands
- Fixed rare crash when changing character empire
- Fixed crash when rendering header panel for Civilian Ships section

COMPATIBILITY
- Added better handling of 'Unsupported Graphics Profile' error (DirectX 11 not supported): auto-reset from DXVK to DirectX 11 if relevant and explain need to upgrade video driver

GAME DIFFICULTY

- Research bonus thresholds for research projects for non-player factions now progressively scale with game difficulty level (non-players have lower thresholds)
- Fixed game difficulty level being incorrectly reset when start a new game at difficulty higher than normal

UI IMPROVEMENTS
- Now properly clear active textbox when press Enter so that subsequent keypresses properly handled by UI without additional mouse clicks (e.g. when rename item in Selection Panel)
- Readjusted available user interface sizes based on vertical screen resolution
- Ensure properly close diplomacy detail panel when exit to main menu
- Fixed armor components not showing in ship damage report when empire has not yet researched the armor component (acquired high tech ship)

SHIP DESIGN AND RETROFITS
- Fixed bug with Ship Design retrofit path where ships and bases would sometimes retrofit to the wrong design when using 'Latest Design for Largest Hull for Role'
- In Ship Design screen, selected component is now cleared only when right-click in empty part of model view area (not when left-click)
- Fixed faulty text in tooltip on Retrofit action button under Selection Panel when multiple designs available for ship or base ('Multiple None Designs available')
- Slightly reduced energy over-allowance factor when auto-generating ship and base designs so that do not generate designs with insufficient energy collectors
- Disallow setting civilian ship and bases to manually retrofit using button 'Mark Selected As Manual Retrofit' in Designs List screen
- Removed some incorrect warnings for some ship roles in the Ship Design screen

SHIP AND FLEET BEHAVIOR
- Improved passenger ship migration mission selection in situations where few migration sources for destination colony due to limited available suitable races or low source population
- Automated fleets no longer attack pirate bases in foreign territory unless manually queued
- Some ships no longer participate in salvaging debris (Colony Ships), while all others are now more cautious to not salvage while there are threats at the location

FIGHTERS
- Tweaked fighter logic so that they are more willing to attack distant targets that their parent carrier is attacking
- Fixed bug where fighters onboard bases or carriers could sometimes get damaged by nebula effects (storms, etc)

REPUTATION
- Reduced reputation impact from hunting space creatures and destroying pirates

DIPLOMACY AND WAR WEARINESS
- Tweaked how race aggression and caution values affect diplomacy: more aggressive races slightly more likely to pursue conquer strategies. more cautious races more likely to pursue friendly strategies
- Properly include war weariness reduction bonus when displaying war weariness for a faction in Diplomacy screen and other places
- Tweaked tech trading costs so that other faction does not value items too low

COLONIZATION AND MIGRATION
- Fixed Colony Ships sometimes constantly loading and unloading colonists when preferred colonization target currently has threats (dangerous location) and alternative colonization targets also have threats

POPULATION POLICIES
- Additional increase for slavery income factor, note that for maximum revenue you will likely want to control taxes on planets with slavery manually
- Altered how slavery colony population policy affects happiness and reputation - constant impact level based on amount of population enslaved
- Rebalanced income and unhappiness from slavery colony population policy

RESEARCH
- Ensure always enable all first-level diplomacy research projects for all colonized races in empire,

regardless of how acquired (e.g. first contact with race may be through colony conquest)
- Slightly increased automated building level for research stations (when viable research targets exist)
- In Research Screen fixed research projects sometimes incorrectly disallowed from moving up in queue when optional random path to parent project not enabled
- Fixed display of Slavery Unhappiness modifier value to be green (beneficial) when value is negative on Enslavement Control facility in Research screen
- Tweaked research paths for troop transports to avoid requiring the Ikkuro to only research their own splinter pods

INTELLIGENCE MISSIONS
- Adjusted intelligence mission difficulty levels: all missions slightly easier, very difficult missions quite a bit easier
- Ensure properly clear target empire when manually assigning counter intelligence missions to own spies
- Factions with Internal Stabilization intelligence mission now use it more frequently
- Fixed intelligence mission success chance sometimes being incorrect in Character Mission screen in mission target selection dropdown list
- Fixed ambassadors not gaining experience from intelligence missions when assigned to pirate factions
- Fixed Spy Mission user interface for new Dhayut intelligence mission types (Influence Empire Positively and Influence Empire Negatively) to ensure player supplies Mission Target empire

LEADERSHIP CHANGES
- Greatly reduced chance of rebellion at capital colony after disruptive leadership change

CHARACTERS
- Decreased minimum total skills before characters are auto-dismissed from 0% to -10% (when Characters are automated) to reduce too rapid turnover
- Player faction now never auto-dismisses leader character unless total skills are -50%
- Ensure new leaders are never selected from imprisoned characters

GAME EVENTS
- Fixed some game/colony events not always triggering
- Now include bonus descriptions in tooltip for any active Colony Events at top of Selection Panel (when colony selected)
- Fixed ruins investigation logic to be more careful when evaluating untriggered game events for investigating race
- Extended GenerateShipBase game event action so that can generate ships or bases owned by location empire

NOTIFICATIONS
- No longer send galaxy-wide news messages for colony events that are initiated from race- or government-triggers

MODDING
- Fixed Mod profiles sometimes not being remembered correctly

OTHER
- Additional balance improvements to some research projects, facilities and components
- Added new interstitial loading screen images when DLC installed (Ikkuro + Dhayut)
- Added new Empire Nouns and Adjectives for new government types
- Data file updates with some minor adjustments to Dhayut and Ikkuro research projects
- Fixed 'Mining Bonanza' game event to properly apply temporary mining bonus

v1.1.0.9 "Aurora" – 2nd March 2023
While you can continue your previous games, we strongly recommend starting a new game with this update for the best results as many fixes will not fully affect ongoing games.

TECHNICAL IMPROVEMENTS
- Upgraded to .Net 7.0, which brings some performance improvements

- Switched to "self-contained" build. This increases the size of the DW2 executable, but means that you do not need to install .Net 7.0 separately
- Updated DXVK version 1 with the most recent changes
- Added DXVK version 2 as a new rendering option.
  IMPORTANT: *Please remember that if you try one of the alternate DXVK rendering options and DW2 will not launch, you should use the –use-dx11 command-line parameter or delete the gamesettings and gamestartsettings files in the /data sub-folder of your install directory to tell DW2 to start in the default DirectX 11 mode again.*

COMPATIBILITY
- Added startup warning when attempt to run DW2 on video cards with inadequate specs (DirectX-11 support required)
- Added extra check for corrupt game settings at game startup and auto-regenerate if necessary

PERFORMANCE IMPROVEMENTS
- Improved performance (reduced micro-stuttering) especially in battle scenes where many ships are destroyed at once or many ships change empire

CRASH FIXES
   Many crashes of various kinds, mostly rare, were fixed since 1.0.8.6 and DW2 is generally much more stable when running the Aurora update.
- Fixed crash that sometimes occurs when setting CPU processor affinity on single-core computers
- Fixed rare crash when ship attacks target
- Fixed rare crash when ship fires weapons at enemy target
- Fixed rare crash when repairing ship damage
- Fixed rare crash when changing empire relation
- Fixed crash when removing disabled ships from fleets
- Fixed crash when rendering Galactopedia article for alien race with missing description
- Fixed crash when fleet evaluates whether to attack a target
- Fixed crash when determining empire stock levels
- Fixed crash when splitting empire during disruptive leadership change
- Fixed crash when ships is firing weapons at targets
- Fixed crash when determining ship construction amounts
- Fixed crash when empire updates its known visible data
- Fixed crash when splitting empire during civil war
- Fixed rare crash when generating a new game
- Fixed crash when ship attacks target
- Fixed crash when ship is hyperjumping
- Fixed crash when upgrading ship design from loaded design where hull has subsequently changed
- Fixed crash when calculating empire bonuses
- Fixed rare crash when loading savegame
- Fixed rare crash when ship attacks target
- Fixed rare crash when drawing system badges in galaxy view
- Fixed crash when reviewing empire bonuses
- Fixed crash when checking whether a ship or base is under construction or repair
- Fixed crash when changing empire relation
- Fixed crash while evaluating current attack target
- Fixed rare crash when attempting to determine amount of video memory in system
- Fixed bug where exploration ships could sometimes get locked in endless loop attempting to explore location. This could cause predictable crashes and the appearance of save file corruption.
- Fixed crash when ship or fighter performs attack mission
- Fixed crash when drawing government bonuses
- Fixed crash when drawing research screen after discover 'Mysterious Plague'
- Fixed crash when disabled ship checks for repair at nearby yard
- Fixed rare crash when ships scan area for threats
- Fixed rare crash when loading game

- Fixed rare crash when ship assigns retrofit mission
- Fixed rare crash when repairing abandoned ship or base
- Fixed rare crash when calculating colony bonuses

MODDING

This update adds Steam Workshop support for Distant Worlds 2 modding. It also includes our first in-game Mod Manager (for all mods, not just Workshop mods) and improved modding support, which is documented below.

- Distant Worlds 2 now supports Steam Workshop modding (see additional documentation in your /Manuals sub-folder for details)
- Added additional modding documentation and two modding tutorial videos on ship modding and how to organize and upload DW2 mods to Steam Workshop in the /Manuals sub-folder of your installation location
- Eliminated requirement for modders to regenerate SHMD files when ShipHulls.xml or models change (this is now done seamlessly whenever these change)
- Greatly increased the speed and stability of SHMD regeneration

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DW2 Modding currently supports the following modded items:
1. XML data files
   - Mods should add their own versions of these files by appending a suffix to the filename, e.g. Races_MYMOD.xml. The file will then be loaded after the base Races.xml file, adding any new entries and overriding any existing entries that use the same RaceId value
     - All of the XML data files use this same file-naming and item-overriding approach. So you can change data in the base XML data files by using the same Id value in a modded file, e.g. OrbTypeId for OrbTypes.xml, ResearchProjectId for ResearchProjectDefinitions.xml, etc.
   - All of the following XML data files can be modded:
     - ArmyTemplates.xml, Artifacts.xml, CharacterAnimations.xml, CharacterRooms.xml, ColonyEventDefinitions.xml, ComponentDefinitions.xml, CreatureTypes.xml, DesignTemplates.xml, FleetTemplates.xml, GameEvents.xml, Governments.xml, OrbTypes.xml, PlanetaryFacilityDefinitions.xml, Races.xml, ResearchProjectDefinitions.xml, Resources.xml, ShipHulls.xml, SpaceItemDefinitions.xml, TroopDefinitions.xml
     - Documentation and tools for some of the above file types can be found here: https://www.matrixgames.com/forums/viewtopic.php?f=11899&t=380486
2. Localized game text in GameText.txt
3. Stride content bundles
   - Stride bundle files built in Stride Game Studio, containing models, materials, textures, spritesheets and sound effects
     - To load bundle files they must be listed in the mod.json file (see below)
4. Music files and folders
   - Standalone music files in any of the following formats: MP3, WAV, AIFF, WMA

- Now allow disabling base game music in favor of mod music
- Added initial modding user interface to allow multi-mod loading, including priority and enable/disable
- Added new user-customizable Mod Profiles to allow saving and reloading a collection of ordered mods
- Multiple profiles will allow for different configurations of enabled mods
- Mods are now enabled and applied when exit the mod screen (no need to restart the game)
- Now allow overriding GameEvents.xml by name (easier to include in mods)
- GraphicsSettings.xml files (Galaxy, System and Location) can now be included in mods and will override default files in base game

- Improved mod support for ship components and research projects (allow non-sequential Id values)
- Mod descriptions now support simple markup for text formatting
- Upgraded layout and display of Mods screen

AI IMPROVEMENTS

The AI improvements in this update are the result of a lot of work and testing and should result in a significant improvement in the ability of the AI empires to keep up with and be competitive with the player. Please start a new game with the Aurora update for best results.

- AI empires now more careful to maximize funding for research and colony growth to ensure full research and growth rates, thus making them more competitive with the player
- Tweaked some AI research priorities
- Now use Race.PreferredWeaponComponentIds for more targeted research
- More focused on a single weapon branch per type (close-in, stand-off, etc)
- Slightly increased effect of galaxy aggression level so that empires more likely to declare war, etc
- Depending on game difficulty level, ensure have antagonistic races next to player to increase tensions
- Automated military ships now properly cancel guard mission when target changes empire
- Fixed wrong ship hull names for additional items in description of Build Ships advisor suggestion
- When acquire abandoned ships or bases now automatically mark acquired design for ship or base as obsolete so that unused for any other construction or retrofits
- AI empires no longer pay research project initiation costs when difficulty level is normal or higher
- AI empires require progressively less research funding at higher difficulty levels (cheaper to fully fund research)

GENERAL UI IMPROVEMENTS

Many improvements were made to the UI based on experience and player feedback. Many of them will make playing in a more manual playstyle easier than it was, but also should make general empire management much easier. There is also a new Free Form camera mode!

- Added new cycling keys for idle ships and fleets: J for next idle construction ship (shift-J for previous), Z for next idle exploration ship (shift-Z for previous), N for next idle military ship (shift-N for previous), H for next idle fleet (shift-H for previous)
- Changed Control Center list item sort options: 'Distance from Spaceport' is now 'Distance from Selected Item or Capital,' meaning distance from currently selected item in Selection Panel, or from empire capital if nothing is selected
- Hovered Control Center list items now have callout line leading from list item to position of item in galaxy
- Added fleets of own empire to system-level view summary (previously fleets were only shown in galaxy-level summary view)
- Tooltips for each race in Colony Population Policy screen now also shows their suitability for that colony
- Extended Escape keypress (close screen) to include File Load/Save dialog, Galactopedia and Colony Detail screen
- Added colored border to Terraforming Facility image in Planetary Facilities List when colony has reached maximum terraforming level (better visibility and indication that facility should be dismantled)
- Reduced items in Display Mode list (Game Settings screen) to one item per resolution (exclude refresh rate)
- In Key Mappings screen fixed key mappings incorrectly displaying previous unapplied values when click Cancel button and then re-enter screen
- Expanded message log is now properly closed when view Ship Design (previously left in half-expanded state)
- When have empty Colony Ship selected, can now choose which colonist race to load when right-click on colony for popup menu mission options (as long as population for race is above minimum threshold of 500 million)
- Now properly reset cached values for resources mined and resources known in Known Resources list when load or start new game

- Fixed Known Resources list being blank when open by clicking on resource in Selection Panel and current filter settings exclude the selected resource
- Added filter option 'Distance from selected item or Capital' to Dangerous Locations list
- Extended callout lines to most lists in Control Center (troops, characters, planetary facilities, artifacts, special locations, etc)
- Fixed Weapons Report screen sometimes being blank
- Added Race Suitability to each race hovertip in Population screen (like Pop Policy pop-out screen)
- Fixed faulty text formatting in facility tooltip in Troop Ground Report screen
- Fixed wrong size for Ship Hull screen when UI scaling is set to Small
- Ships and bases that cannot normally assign missions to (e.g. privately owned) will now generate right-click popup menu options when have artifacts onboard that need transferring (select ship or base with artifact, right-click on destination)
- Allow rapid removal of messages when repeatedly right-click in message area
- Fixed game menu scaling incorrectly when change UI size
- Added option to right-click popup menu to retrofit or retire ships at colonies of own empire
- Included news messages to all other known empires when civil war occurs in an empire
- Ensure cannot build same planetary facility twice at same colony, even when attempt to exploit advisor messages
- Fixed damaged ships still showing red background in Selection Panel even when fully repaired

SHIP DESIGN UI IMPROVEMENTS
- Added extra buttons to Design List screen: Mark Selected as Auto/Manual Hull Upgrade, Mark Selected as Auto/Manual Retrofit, Mark Selected as Active/Obsolete. All of these buttons can operate on multiple selected designs at once
- Added new filter to Designs List screen: Manual Upgrade Designs
- Can now edit a ship or base design when it has been previously used, as long as there are no current ships or bases for the design
- Initial name for manually created ship designs now uses default faction design names (instead of 'New Destroyer', 'New Mining Station', etc)
- Altered crew capacity display in summary in Ship Design screen: now show 'used/capacity' instead of 'capacity/used'
- In the Ship Design screen, right-clicking on empty space in the design view now deselects the active component in the Available Components list
- In the Ship Design screen, shift-clicking on an available component will now add the component to the first matching empty bay (same type and within size limits)
- Ensure Save Designs process excludes deleted designs
- Improved Load Designs process to avoid duplicate designs when are equivalent to existing designs (same name, hull and components)
- Include hull name of design in advisor suggestion to build new base
- Adjusted label width for hull bonuses in Ship Design screen
- Added Ship Hull column to Designs List screen
- Altered Selection Panel display for ship design to show hull name instead of role. Same change for tooltips for fleet ships and multi-selected ships
- Added new column in Ship Hull Dialog: active design count
- Ship Design filter for 'State Ships' now also includes fighter designs
- Fixed occasional jerky display in Ship Hull screen for some user interface scaling sizes
- Added automation button to top of Ship Designs List screen, indicating current Policy ship design automation setting and allowing toggling between automated and manually controlled
- Now include hull names with designs listed in 'Other Designs That Upgrade To This Design' panel in Ship Design screen
- Added 'All Inactive' filter to Designs List screen

SHIP AND FLEET UI IMPROVEMENTS
- In Military Ships list, filters for 'Ships in a Fleet' and 'Ships Not in a Fleet' now include ships under construction
- Added Stop action button under Selection Panel when fleet selected

- Added rebindable keyboard shortcut for Stop action for ships and fleets. No key assigned by default, but can assign in Key Mappings screen

RESEARCH UI IMPROVEMENTS

- In Research screen can now shift-click to move research projects to top or bottom of queue
- No longer need to press shortcut key twice to open Research screen for first time in a game session

TROOP UI IMPROVEMENTS

- Added new filter to Troops List: At Selected Location. This shows only the troops at the currently selected colony or ship, allowing you to easily shift-click to select multiple troop units and make changes to them all (e.g. garrison/ungarrison). Double-clicking a troop unit in the Selection Panel will automatically open the Troops List with this new filter enabled, and auto-select all the troops at the location
- Can now multi-select troops in the Colony Detail screen and then use Garrison/Ungarrison or Disband action buttons for all selected troops (shift-click for range selection, ctrl-click to add/remove single troops to selection)

GALAXY SETUP UI IMPROVEMENTS

- In Start New Game screen now allow a mix of both auto-generated and manually-specified other empires
- Implemented display of all race- and govt-specific variations in Start New Game screen, Govt screen and Galactopedia to help players understand what differences exist.

CAMERA MODE IMPROVEMENTS

- Added new Free Form camera mode: can change camera elevation (as well as rotation) by moving mouse forward/back while holding down middle mouse button. Select this camera mode from the Change View button at bottom-right of screen, or use keyboard shortcut 'Tab'
- Locking camera view on hyperjumping ship no longer shakes
- Fixed issues with camera movement in top-down view mode: initial game start zoom-in, 'Show Me' message buttons
- Allow slightly further zoom-out in galaxy-level when in top-down view mode (allow viewing more of the galaxy)
- Fixed offset galaxy view when locked on to hyperjumping ship

SHIP BEHAVIOR

- Assigning Refuel/Repair/Retrofit missions to ships no longer changes them to manually-controlled (but manually assigning any other mission types will still switch them to manually controlled)
- Changed default civilian ship tactics to Engage When Attacked (previously was Do Not Engage) so that will fire back at attackers
- Fixed ships sometimes getting stuck in constrained collision avoidance situations
- Fixed ships sometimes not clearing missions when mission target is destroyed
- Fixed ships sometimes not being able to fire at creatures when creature has strayed outside location

FLEET BEHAVIOR

- Fixed Fuel Tankers sometimes cancelling mission when jumping with fleet
- Fixed automated invasion fleets sometimes stuck waiting indefinitely for sufficient invasion troops due to flawed assessment of assault pod range

SHIP DESIGNS, RETROFIT PATHS AND FLEET TEMPLATE CUSTOMIZATION

Major improvements to ship design retrofit paths and fleet template customization were implemented in response to many community requests for more fleet template and ship design customization options and which worked better with the new ship hull variations.

We now allow the player to set multiple designs/hulls per role in their fleet templates and also very specific upgrade paths for every ship design. The ship design and fleet template system are now designed to fully support the ship hull concept in all respects and to allow the player to choose how strict or flexible the templates are as well in following the specified designs.

__Important Note:__ Ship designs are now the authoritative place for all ship upgrade paths. That means that if you specify a precise ship design in your fleet template and it has a newer design to retrofit to, the fleet template will update to that newer design as well. If you don't want this to happen, you need to specifically tell it not to do so by disabling the Auto-Upgrade setting in the

fleet template.

SHIP DESIGNS AND RETROFITS

- Added Retrofit Path panel to Ship Design screen, allowing player to specify how a design should upgrade. Default retrofit path is to upgrade to the latest design for the same hull
- There are also now upgrade paths for ship designs. This will allow you to specify which design a ship or base will retrofit to. The default setting for designs will be to 'upgrade to latest design for Ship Hull' (instead of 'upgrade to latest design for Role' as it is now).
- Changed retrofit action button (below selection panel) to only retrofit to single design resolved from retrofit path defined for current design. To instead see and retrofit to any active design for the role, you can now right-click the ship or base for a popup menu with a complete set of retrofit options
- When a spaceport is selected, the Retrofit action button now allows retrofitting across spaceport sizes (small, medium, large) when there are active designs for other size roles. This is in addition to the existing behavior where right-clicking on the spaceport will allow retrofitting to any active spaceport design of any size
- Upgrade Design button now copies retrofit path settings from old design, unless old design was retrofitting to a specific design, in which case the new design uses the default retrofit path of 'latest design for largest hull for role'
- Upgraded ship design automation toggle to be per-hull instead of per-role (Designs List screen)
- Automated ship design now generates designs for each ship hull instead of for each role
- Reorganized layout of Ship Design screen, moving tactics and other settings buttons to right side
- Changed default filtering in Designs List screen to show all active designs
- Added new design upgrade option: Latest Design for Largest Hull for Role. This is the default setting for new fleet template items
- Improved design naming for all roles and races: now using race-specific design names for military ships. Also include hull name after design name to allow easier identification in tooltips, etc
- In Retrofit Path panel in Ship Design screen, ensure that upgrade design shown in brackets after 'Latest Design for Hull', 'Latest Design for Role' and 'Latest Design for Largest Hull for Role' is actually buildable for your empire (have required hull and components)
- In Retrofit Path panel in Ship Design screen, ensure that 'Other Designs That Upgrade To This Design' properly accounts for whether the current design is actually buildable for your empire (have required hull and components)
- Increased priority of Damage Control components when auto-designing spaceports
- In Ship Design screen, properly exclude obsolete designs when evaluating 'Other Designs That Upgrade To This Design' (unless specific retrofit design)
- Auto-generated player ship and base designs now set default Retrofit Path to 'Latest Design for Hull' when there are multiple hulls at largest size for role, i.e. preserve multiple specialized designs per role
- Immediately refresh latest designs for role/hull when change design status (active/obsolete) in Designs List screen so that retrofit action button always shows proper retrofit design
- Ensure "Save and Exit" button in Ship Design screen always properly indicates that design can be saved, even when components are not editable (design in use). In other words, always allow changing and saving Retrofit Path or Tactical settings for a design

FLEETS AND FLEET TEMPLATES

- Altered how fleet templates work. Can now add items free-form to allow multiple items per role. Can specify items by shiphull as well as specific design and role
- This allows you to focus more on Ship Hulls instead of Roles, giving more options for specialized fleets
- Added new buttons in Fleet Template screen: allow role up/downgrading and allow trimming excess ships. Turn these off to enforce strict adherence to fleet template for ship roles/hulls/designs (e.g. Top Up Fleet button)
- Improved logic to trim excess fleet ships
- Improved how fleet template AI evaluates 'Latest Design for Largest Hull for Role' so that resolves to latest active design with largest hull (i.e. try other smaller hulls until finds active design)
- When a ship design is made obsolete but has an explicit upgrade path to a new specific design,

any fleet templates that use the old specific design are now auto-upgraded to instead use the new specific design (i.e. no need to separately update the fleet template. However this auto-upgrade of fleet templates only applies to specific explicit designs, not 'Latest for Role', etc)

- Fixed wrong ships sometimes being added to fleet when generating new fleet using Form At button in Fleet Template dialog (not matching design specified in fleet template)
- Building fleet from template (Fleet Template screen) now always builds ships when not already available in empire, even when does not require specific design (e.g. Latest for Role)
- Fixed Fleet retrofit logic to align with expected retrofit designs for both fleet template and individual ship retrofit paths
- Ensure do not get double the number of expected ships in new fleet when build from Fleet Template List screen using option at 'Any construction yards in empire' (when selected fleet template has specific designs)
- Ensure Form At and Build At buttons in Fleet Template List screen have correct disabled status when first enter screen but have not yet selected a fleet template
- Now exclude consideration of ship maintenance costs when building ships for new fleets when building via the Fleet Template screen (ensures always built as long as have money and resources)
- Updated FleetTemplates.xml to ensure default fleet templates use setting 'Latest Design for Largest Hull for Role'
- Periodically update fleet templates so that any specific designs that have become obsolete are automatically upgraded to the next non-obsolete design in it's upgrade path. This keeps fleet templates up-to-date as new designs are created and old ones become obsolete
- Added corresponding setting in fleet template dialog to enable/disable auto-update of specific designs in fleet templates
- Improved logic when determining home bases for defend fleets (less churn)

BUILD ORDER SCREEN
- Now show hull name after design name
- Default selection for each role to latest design for largest hull for role

RESOURCES AND FREIGHTER LOGISTICS
- Significantly slowed mining rates for mining components
- Significantly slowed mining rates for mining components
- Improved mining ship target selection so that prioritizes missing critical resources even when mining target is already queued to build a mining station
- Altered automated resource stock levels for bases not at colonies: no longer have fuel stock level unless mine fuel at location; note that this means most bases will depend on energy collection for their defenses/weapons, we plan to adjust this further in the future
- Improved freighter resource fulfillment by further increasing amount fulfilled over stock level

CONSTRUCTION
- Improved display of construction/repair progress percentage in tooltip for items in construction yards in Selection Panel - now include components under repair to give more accurate percentage in these cases
- Ensure properly take ownership of all ships in construction yards (or destroy if cannot) when invade and conquer enemy colony
- Fixed research stations and resort bases sometimes not able to be built using construction action buttons (under Selection Panel) when research or scenery bonuses at location come from facilities or ruins
- Ensure abandoned repaired ships or bases are always acquired by repairer

INTELLIGENCE MISSIONS
- Added mission success chance to each mission type and target in Spy mission screen
- Indicate current research project in targets in Spy mission screen
- Rebalanced intelligence mission difficulty level so that there are fewer very low success chances
- Rebalanced intelligence mission outcomes so that less captures (more partial successes and failures instead)
- Updated Intelligence Missions article in Game Concepts section of Galactopedia

DIPLOMACY

- Increased aggression and likelihood of wars, especially on higher galaxy aggression levels

RESEARCH
- Research output from colony populations now diminishes greatly for population over 100 billion. This increases importance of research stations as main source of research output
- Altered research project category for Advanced Star Fighters to Fighter Bay

EXPLORATION
- Fixed some systems not being fully explored when have deeply hidden items

PLANETARY FACILITIES
- Additional check when approving advisor message to build new planetary facility: ensure not overbuilding unique empire or galaxy wonder
- Reduced frequency of advisor messages for Building Planetary Facilities

DANGEROUS LOCATIONS
- Fixed bug where sometimes could not clear queued investigation of dangerous locations

FACTION DIFFERENTIATION
- Added extensive new features for better faction differentiation
- Added migration modifier to governments
- Added government-specific leader titles (President, Prime Minister, etc)
- Added explicit value for ImportanceOfOthersReputations to Races.xml (already existed for Governments.xml)
- Added new field to both Races.xml and Governments.xml: StartingGameEventNames
- Can be used to specify Game Events that will be executed at game startup for empires with the relevant race or government type, allowing for greater differentiation between different races and governments
- Typical uses could be to provide additional tech, facilities or ships/bases for a particular race or government

LEADERSHIP CHANGES
- Implemented Leader Changes and related events for each government type
- Added small chance of civil war and empire split when have highly disruptive leadership change

CHARACTERS
- Slightly reduced typical amounts for spies and other character types (based on empire population)
- Characters picked up in escape pods now properly either join your empire (pirates) or are imprisoned
- Automated character handling will now dismiss any characters with poor skills, not just spies
- Further reduced chance of negative character traits
- Fixed bug where spies sometimes could not assign intelligence missions (missing mission types) due to faulty mod
- Reduced chance of some negative character traits (DoubleAgent for Spies, Corrupt for Leaders)
- Ensure can properly view characters of own empire, even when imprisoned. However cannot interact with them (cannot assign missions, change location or dismiss)
- When character is captured, ensure clear any in progress location transfer for them

COLONIZATION
- Automated colonization logic now more willing to colonize independent colonies, even when do not have suitable population
- When a planet is colonized and thus removes orbiting bases, any troops/characters/artifacts at the removed bases (of the same empire) are now automatically transferred to the new colony

EMPIRE BONUSES
- Bonuses from secondary races in empire now applied proportionally: gain complete bonuses when race is at 50% of total population, and proportionally less when below 50%
- Ensure include empire bonuses from colonies themselves when calculating empire bonuses (e.g. bonus for planet or moon)
- Ensure empire bonuses from colony races are always proportioned based on amount of race in empire

MIGRATION
- Rebalanced colony migration factors to encourage more migration

- Fixed passenger ships sometimes performing repeated migration to and from same target when in empire with low number of colonies
- Further tweaked migration to ensure that always have migration sources, even when all colonies are considered favorable (in this case large colonies will be selected as migration sources)

INDEPENDENT COLONIES
- Lowered overall number of independent colonies when start a new game
- Independent colonies no longer invite to colonize when colony ship already assigned or beyond fuel range

PIRATES
- Reduced number of pirate factions by about 30%
- Ensure that story-line pirate tech levels are reduced when you lower pirate strength in Start New Game screen
- Extended minimum time before pirate raids begin against a faction
- Fixed bug where pirate factions were acquiring tech too quickly and thus had too much tech available for espionage
- Fixed bug where pirate factions would sometimes generate many scientists resulting in too many scientists being gained by empires that destroyed pirate bases

MUSIC
- Fixed bursts of music sometimes playing even when volume is zero

OTHER
- Fixed rare potential issues with resolving mission targets
- Fixed bug where deleting files in Load/Save dialog subsequently allows starting a non-existent game using the Continue button
- Hive ships no longer generate characters (e.g. admirals)
- Fixed flag color issue when starting second game in session
- Increased mesh LOD threshold when determining whether to render component meshes, so that ships and bases with large exterior meshes (e.g. engine pods) stay in view longer as zoom out

DATA CHANGES
- Added extra general component bays to Troop Transport hulls to ensure sufficient invasion fleet range (only available when starting a new game)
- Added differing startup settings for each government type (starting tech, facilities, etc)
- Fixes to various ship hull issues
- Additional balance changes to missile weapons and phased blasters and beams
- Balance changes to armor, shields and damage repair components

v1.0.8.6 – 25th November 2022
This new official update includes some very important bug fixes and performance improvements as well as further improvements across a wide range of gameplay areas. It also allows you for the first time, using the Game Editor, to switch the empire you are playing during the middle of a game.

CRASH FIXES
- Fixed crash when reviewing fleet escort ships
- Fixed rare crash while fleet performs patrol mission
- Fixed rare crash while querying display adapter
- Fixed rare crash when resolving ship jump path location
- Fixed potential crash when use faulty string formatting placeholders in colony event descriptions
- Fixed rare crash when determining jump exit point
- Fixed crash when editing resources at planet in Game Editor
- Fixed rare crash when ship escorts another ship
- Fixed rare crash when reviewing fleet lead ship
- Fixed crash when loading character animations
- Fixed rare crash when making research breakthrough
- Fixed crash when calculating construction yard wait time
- Fixed crash when ship enters hangar

- Fixed crash when rendering exploration section header

PERFORMANCE
- Improved performance, especially in large battle scenes

FLEET AND SHIP BEHAVIOR
- Reduced delays when carriers (and fleets) are waiting for fighters to board before jumping
- Improved ship collision avoidance to better allow missions where target is close to planet or other large body
- Improved fleets investigating and clearing dangerous locations: now better focussed on priority locations for colonization, research and mining

FUEL TANKERS
- Improved fuel tanker evaluation of when to refuel fleet ships versus load more fuel: more likely to refuel fleet ships, even when have to wait for them to exit their current jump

COLONIZATION
- Automated Colony Ships no longer pre-load colonists for non-queued colonization targets when target does not meet minimum suitability threshold defined in empire policy. This eliminates repeated load/unload of colonists in some situations
- Fixed bug where maximum colonization range was sometimes being applied incorrectly, improperly excluding some colonization targets
- Automated colonization now more willing to colonize independent colonies even when have unsuitable race

EXPLORATION
- Exploration ships now better at prioritizing planets and moons before asteroids when exploring a location
- Ensure exploration countdown always reset between exploration targets, especially when performing Explore System mission
- Ensure correct message shown when investigate ship that explodes

ABANDONED SHIPS AND BASES
- Ensure construction ship repairing abandoned ships or bases now take ownership of ship when complete, even when other ships are nearby

DANGEROUS LOCATIONS
- Improved logic to review and remove Dangerous Locations where threats are no longer present
- Now indicate dangerous locations in additional lists, e.g. Abandoned Ships and Bases, thus helping player to avoid queuing construction/repair at locations with threats present

RESEARCH
- Changed research project prerequisite path minimum count to default to 1 instead of total prerequisite path count (can override with PrerequisiteProjectsMinimumPathCount)
- Empires now less likely to crash research higher level research projects (instead use money for other items)
- Improved research project selection in various areas

DIPLOMACY AND EMPIRE REPUTATION
- When an empire is vassalized it will immediately end all wars with other empires unless those other empires are already at war with subjugating empire
- Ensure diplomacy trade offers always exclude special locations where abandoned ships or bases have already been claimed by other empires
- Updated some empire reputation incident amounts and decay rates

SLAVERY
- Slavery population policy now properly adds to colony unhappiness ('We are enraged at your enslavement of our population')
- Increased unhappiness impact on other colonies from slavery and extermination population policies at any colony ('ENSLAVED RACE are unhappy being part of our RACE empire')
- Slavery population policy now severely slows population growth and assimilation

CONSTRUCTION AND REPAIR
- Fixed bug where bases built at independent colonies could not be retrofitted unless the colony had adequate resources
- Increased range at which bases and colonies will auto-construct/repair damaged or incomplete

ships
- Altered automated ship and base construction to give higher priority to initial research station over additional exploration ships and military ships

FACILITIES
- AI now properly also considers income increase from improved quality when determining whether to build terraforming facilities at a colony

USER INTERFACE
- Enemy Targets list filter options now show correct list items even when warring empires change (e.g. a war starts or ends)
- Ensure Mining Stations list shows mining stations at locations with no known resources when sorting by priority
- Ensure system summary (bottom-middle of screen) refreshes when zoom to selected ship
- Fixed bug where tour window was sometimes not properly displayed

EMPIRE COLORS AND FLAGS
- Improved empire color selection to minimize similarity between empires
- Fixed bug where empire colors could sometimes be white (should only be for independent colonies)
- Changed Flag selection dropdown in Start New Game screen to display available flags in grid layout instead of vertical list

GAME EDITOR AND TESTING
- Added ability to play as any standard empire in the game. Can switch player empire in Game Editor (Edit Empire > switch button). This is included for our own testing to help us improve the AI, but you may also find it a fun option. If you spot a problem with the AI decision-making while using this, please do report it to us.
- Ensured that Suppress All Popups game setting always works, even for initial pirate encounter. With this change and usine Rule in Absence and the "Always Investigate" exploration policy settings, fully automated games without interruption should now be possible.

SOUND
- Ensured sound effect volume always applies for button clicks, etc, even in main menu

DATA
- Reduced costs for Diplomacy tech projects
- Corrected some typos in game events
- Added additional late game research paths from Haakonish and Zenox unique weapons
- Corrected a research bonus issue with the Koloros Medical facility

OTHER
- Fixed debris fields often being generated at home planet
- Fixed Hive ships sometimes not mining fuel properly
- Added missing automation setting in race policy files

v1.0.8.3 "Pathfinder" – 1st November 2022

This massive update takes a series of steps towards completing our current roadmap to both fix reported issues with Distant Worlds 2 but also to improve a variety of gameplay areas as part of ongoing post-release support.

Based on community feedback, over the course of two months of development for this update, we have significantly improved and in some areas redesigned Research, Diplomacy and Reputation, Subjugation and Wars, Colonization and Migration, Performance and Memory Management, User Interface, AI and Ship and Fleet Behavior.

Thanks to the generous work of composer / sound designer Jeff Dodson of rainfall.tv, we have also added new significantly improved and rebalanced sound effects for most components and weapons, explosions, etc. Jeff's trailer sound design work is heard in small projects like "Star Wars" and should help spice up combat among other things.

Finally, we've doubled the available empire flags and colors and added guidance on the main galaxy setup for which galaxy sizes are best suited to your computer hardware. We strongly recommend starting a new game with 1.0.8.3 in order to benefit from all the changes and improvements it has to offer compared to the last official update. We wish your empire success as you travel to Distant Worlds!

CRASH FIXES
- Fixed game not starting for some players who had other software that improperly mapped the wrong versions of shared files (freetype.dll)
- Fixed rare crash when determining jump path time to destination star system
- Fixed rare crash when determining docking bay parking spot
- Fixed rare crash when calculating docking position offset
- Fixed rare crash when inserting ship into docking wait queue
- Fixed crash that sometimes occurred when declaring war
- Fixed crash when drawing ship weapon summary
- Fixed crash when ship assigns exploration mission
- Fixed crash when rendering background room for character
- Fixed rare crash when drawing ship health summary
- Fixed rare crash when unloading troops at colony
- Fixed rare crash when fleet checks whether should invade colony
- Fixed rare crash when displaying trade offer with independent colony locations
- Fixed crash when determining random docking position for ship
- Fixed crash when drawing empire economy
- Fixed crash when showing some tour screens

START NEW GAME SCREEN
- In Start New Game screen added warning borders and tooltips to indicate when the largest galaxy sizes may cause performance issues on some systems, especially if played into the late game or without victory conditions.
- Ensure player starting relation level for other empires (Start New Game screen) excludes pirate protection and selects correct trade treaty (RTA, LTA, FTA)

PERFORMANCE AND MEMORY MANAGEMENT
- Significant performance improvements, especially for large late-game galaxies
- Improved general memory management
- Improved memory management when rendering character animations
- Galaxy-level star drawing and some other rendering now uses instancing, improving rendering performance
- Further improved rendering performance in Control Center lists, especially in large late-games

SOUND DESIGN
- Thanks to generous work by Jeff Dodson of rainfall.tv, we have added new significantly improved and rebalanced sound effects for most components and weapons, explosions, etc. Jeff's trailer sound design work is heard in small projects like "Star Wars" and should help spice up combat among other things.

DIPLOMACY AND REPUTATION

This area has had a comprehensive overhaul, both to fix reported issues but also to rebalance reputation and relationship modifiers (including the penalties for being stronger than your neighbors), how reputation interacts with relationship and colony happiness and how much reputation affects how empires see each other and how your people see their own empire.

We've also added the missing Subjugated Vassal relationship and expanded the role and feedback related to Ambassadors, which are needed for the more advanced treaty types and also improve the rate of improvement for positive long-term relations and accelerate the decay of negative relations when assigned to an empire.

Finally, a lot of work went into fixing issues related to how wars end and how willing the AI was to negotiate the ends of wars correctly. All of this should make Diplomacy more rewarding as a playstyle, but also significantly decrease problems related to diplomacy and reputation for more warlike factions.

- Subjugated Vassals:
  - Empires that are losing war now much more likely to be willing to end the war, and even to become your subjugated vassal when losing badly
  - Added Subjugated Vassal diplomatic relation type (see Galactopedia for details: Game Concepts > Diplomacy - Treaty Types)

- o Clarified description of treaty trade item for Subjugated Vassal in Diplomacy Trade screen ('Offer to become Subjugated Vassal')
  - o Tooltips on Peace and Subjugation trade items in diplomacy trade screen now include indication of value of extra incentive required when other faction wants additional inducement to end war
  - o Ensure vassal tribute income properly shown in Projected column of Annual Income section in Economy screen
- Diplomatic Strategy:
  - o High-level diplomatic strategy now pays more attention to overall situation for faction, not just one-on-one relations. Thus more likely to seek out allies against threatening neighbors, even when would not normally otherwise ally with faction.
  - o Diplomatic strategy now also affects empire evaluation of neighboring strength. Concern about strength will be greater if their diplomatic strategy towards you is a negative one.
  - o Preserve existing diplomatic treaty when matches current strategy for faction, even when evaluation drops below typical level for the treaty (e.g. advisor suggestions)
  - o Now force immediate update of each faction's diplomatic strategy whenever conclude trade, change treaty, etc in diplomatic conversation screen
- Pirate Wars:
  - o Fixed bug where wars would start with pirate factions when they raid your colonies
  - o Ensure capturing pirate base eliminates pirate faction (not just when destroy pirate base)
- Diplomatic Reputation:
  - o Capped maximum and minimum reputation levels
  - o Adjusted soft cap to impact of reputation in diplomacy
  - o High reputation now also reduces envy factor from other empires ('We are envious of your huge strength and power')
  - o Reputation impact from events is halved when above or below high or low thresholds, meaning that extreme reputation levels, once achieved, are slower to shift
  - o Reputation factors on average now decay much more slowly, especially if your reputation is strongly positive or negative
  - o Less concern over others' reputations when you and other faction both have positive or negative reputation levels, i.e. more concerned when other faction has opposite reputation to you as well as a significant reputation gap
  - o You can now gain positive reputation from additional actions such as releasing prisoners, signing new treaties, researching diplomacy techs, destroying hive ships and planet destroyers
  - o Rebalanced all reputation impacts and decay rates
  - o No negative reputation impact from espionage against pirates
  - o Diplomacy trend values update faster than previously. Reputation trend values update much faster than previously. This means that as your relationship or reputation change, it will take less time for other empires to notice and reflect that change in their relationship with you.
  - o Honoring defense treaty by declaring war on aggressor no longer incurs war justification penalty or war grace period penalty ('too soon since last war')
  - o Fixed bug when modifying empire reputation near minimum or maximum limits
  - o Updated Empire Reputation Galactopedia article to include explanation of Slavery and Extermination colony population policies
  - o Reduced overall impact of very good or very poor reputation on colony happiness
  - o Once empire reputation goes over +10 or below -10 then has diminished impact on colony happiness
- Diplomatic Relationships:
  - o Updated values for long-term diplomacy effects for some treaty types to better balance diplomatic progress
  - o Capped display of diplomacy trend values so that do not show misleadingly high or low values even when have fast-moving trend (trend magnitude never larger than target value)
  - o Ensure clear some positive diplomacy values with other faction when they bombard,

invade or destroy one of your colonies
- o Lowered soft cap for some diplomacy factors: relationship and beneficial treaties with friends and enemies
- o Fixed buggy display of diplomatic relation incident trend values when transition from positive to negative or vice versa
- o Ensure cancel treaties with other faction when they bombard, invade or destroy one of your colonies
- o Adjusted soft cap for some diplomatic factors: relationship with friends, relationship with enemies
- Ambassadors:
  - o Some high-level treaty types now require an ambassador to be assigned to the foreign capital before they will be accepted
  - o Ambassadors now properly apply diplomacy bonus to modify evaluation of your empire by assigned faction (when at faction capital)
  - o The diplomacy screen now correctly shows the consolidated effect of any assigned ambassadors and your leader on a given faction
- Trade and Negotiation:
  - o Diplomacy trade panel adds new functionality to move view to trade items that are visible to your faction. Click 'eye' icon at right side of trade item
  - o Bases available for trade in diplomacy trade screen now show as 'Unknown Base' when not visible to player
  - o Ensure all techs valued properly in trade deal screen (none should be zero unless truly worthless to other faction)
  - o Fixed tech trading sometimes excluding research projects that you do not have access to (e.g. projects that your tech tree has no path to, even though other faction has researched the project). Note that tech trading does properly exclude projects based on your tech level in a research area, but this fix now deliberately includes projects that you may not have a path to (when appropriate for your tech level). Note that this fix also applies to some other situations where you can acquire tech, e.g. when conquering an enemy colony, when using spies to steal tech.
- Diplomatic Techs and Assimilation:
  - o Colony population assimilation rates for specific races now improved by researching diplomacy projects in tech tree at rate of 10% per improved relationship point
- Treaty Fixes:
  - o Ensure Intelligence Sharing treaty now properly shares results of espionage missions with partners
  - o Ensure Research treaty properly gives bonuses to each factions research speed
- War Resolution:
  - o Lowered threshold from war losses where an empire will consider ending a war (more likely to end war when losing badly)
  - o Empires now more willing to offer incentives to end unwanted wars
  - o Unhappiness from war weariness now applied to colonies with race and govt mitigation factors (mainly based on war weariness reduction), so that aggressive factions now have less unhappiness from war weariness and thus less negative impact from wars
  - o Empires now more likely to honor minimum interval between wars with same faction
  - o Vassal empires now include minimum interval between wars with same faction when considering whether to rebel against parent empire
  - o Fixed bug where diplomatic incidents were being applied to wrong empire when declare war while still have Defense or Non-Aggression treaty
  - o Fixed bug where offers to end war sometimes cannot be accepted

RESEARCH

This is another area which benefited from a significant amount of development attention. Based on community feedback, we found that Random research in particular was not working as intended.

The intention was always that when choosing Random research, some techs or sub-trees could be missing from the research tree. This does not mean that they are absent from the game,

but that they would need to be enabled through trade, espionage, exploration, salvage or conquest rather than just through research. We also found that some random paths were being incorrectly generated and thus required too many pre-requisites for some projects or made others available that should not have been. With this update, Random research issues should be resolved.

We also fixed a variety of other issues and began improving the research AI. More work in this area will come in the next series of updates.

- Altered how research project prerequisites work: now often only require a subset of all the prerequisites for a project instead of all prerequisites as previously. This fixes the issue where race-specific techs added to the required prerequisite paths instead of just being a part of them.
- Research project bonus requirement amounts now scale with galaxy size - larger galaxies have higher research bonus threshold requirements due to being easier to find the necessary research bonus locations
- Fixed bug where research projects with fallback paths were sometimes not appearing on tech tree when should have
- Now exclude race-specific tech from non-playable races when stealing or trading tech, or acquiring through other means (e.g. colony conquest)
- Tweaked which research projects an empire can acquire through colony conquest
- Tweaked which research projects are available for trade and stealing (spy missions): spies can now perform repeated steal tech missions for same project even when visible to their empire
- Set default maximum concurrent research projects to 1 in empire policy
- Fixed some research projects remaining invisible after steal tech spy mission or acquire through other non-standard means
- Fixed bug where minimum path count for some research project prerequisites were defaulting to one, which was incorrectly reducing the number of prerequisites that needs to first be researched
- Fixed research projects sometimes incorrectly showing up on tech tree when no parent paths (when using randomized research)
- Fixed higher level research projects sometimes improperly being researchable even when have no path to them from base of tech tree
- Fixed some research projects not generating with all required prerequisite paths
- Ensure pirate factions exclude some research projects at game start that they value lower (colonization, facilities, diplomacy), thus not being available to trade or steal from them
- Now allow AI to initiate research projects even when uses reserved spending (colony ships, wonders) when there are no projects in the queue and the project initiation cost is relatively low
- Slightly reduced AI research priority for diplomacy techs
- Slightly reduced AI research priority for some planetary facilities, especially research facilities

MIGRATION, COLONIZATION AND COLONY POPULATION POLICY

- Ensure migrating populations honor colonization minimum suitability level from empire policy, i.e. race does not migrate to a colony unless suitability is +20 or better (default level)
- Automated colony ship construction now considers preferred colonization race (suitability) and location of colonization target when determining where to build new colony ship (first choice is closest colony to target with preferred colonization race)
- Added further improvements when selecting construction locations for automated colony ships, especially when handling multiple simultaneous manually-queued colonization targets
- Fixed bug where colony ships could sometimes continually load and unload colonists but never colonize a target, especially when have many queued colonization targets and many colony ships
- Reduced colonies constantly rebelling when using enslave or exterminate policy. However note that using these policies will increase unrest of affected races at your colonies, likely eventually leading to rebellion
- Fixed issue where constantly rebelling colony with population set to exterminate would push population above 30 million, thus never completing extermination
- Ensure colony is removed when all of its population is exterminated (population policy)

FLEETS AND SHIPS

- Tweaked default fleet templates: larger Attack and Invade fleets
- Ships added to fleets via topup now check whether have enough fuel to reach fleet, if not then first

refuel at nearby location before proceeding to form-up with fleet

- Automated generation of invasion fleets now also checks whether have enough existing troops or spare troop maintenance to supply troops from army template for new fleet
- When a ship changes fleets it now auto-cancels any escort missions for old fleet (escorting fleet capital ships)
- Ensure ships that get stuck inside stars/planets/etc can always properly extricate themselves without other factors overriding that behavior
- Automated construction ships now more willing to repair abandoned ships and bases when no other bases to build
- Capture ship missions now assigned and retained even when no assault pods currently available (cool down timer)
- Now indicate unavailable assault pod status in Selection Panel and Weapons Report window when ship is assigned a Capture mission
- When a colony is invaded and conquered by another faction then non-military ships from the previous empire clear any missions at the colony (when two empires are still at war)
- Fighters onboard carriers or bases no longer affected by location effects (storms, etc)
- Ensure fleets that are manually assigned to attack enemy fleets at same location always carry out mission, even when not at war
- Reduced default ratio of military ships not in fleets (empire policy)
- Slightly reduced number of raid fleets for empire
- Changed default engagement range for Invasion Fleets from 50% Fuel Range to Nearby
- Mining ships now more careful to select mining targets within fuel range, including whether inside nebulae clouds
- Troop transports in invasion fleets that are invading an enemy colony now attempt to better coordinate assault pod launch (troop drop) so that close together instead of piecemeal landing. Also indicate when waiting for extra invasion forces in mission description in Selection Panel
- Fixed bug where a ships intercept weapons were sometimes incorrectly being used to bombard an enemy colony even when only assigned attack mission against colony (not bombard)

CONSTRUCTION AND SHIP DESIGN
- Fixed Build Order screen sometimes building wrong design for role
- Slightly adjusted construction balance for military ship types: generally fewer escorts and more larger ships
- Increased military ship building levels
- Ensured default design templates for defensive bases include Ion Defense components
- Fixed ships not always being upgraded when research new tech
- Ensure Energy To Fuel converter component works properly

UI IMPROVEMENTS
- Added new button to Population Policy screen: apply policy to all colonies of this type (e.g. Marshy Swamp, Volcanic, Sandy Desert, etc)
- Enabled shift-click to multi-select range of designs in Designs List screen
- Control Center now pauses list updates while hovering over list items (list items retain order) to avoid having to deal with list changes while trying to take a list action
- Now immediately updates right-click mission for hovered item when select an item via hotkey (no need to move mouse), e.g. allow immediate right-click attack of hovered enemy target when select fleet via hotkey
- Made it clearer in user interface when undertaking an action that will very negatively affect your reputation: Bombardment, Slavery and Extermination colony policies, declaring war in wrong situation (insufficient justification, too soon since last war, existing Non Aggression treaty, existing Defense treaty), invading independent colonies, invading colonies when not at war, destroying colonies
- Now show fleet jump range for selected fleet in galaxy view as dashed orange circle (in addition to fuel range)
- Ambassador contributions to diplomacy are now properly called out in the diplomacy tab
- Indicate when characters drawn in list items are transferring to new location (transparent image

with tooltip explanation)
- Immediately update system view summary (bottom-middle of screen) when double-click item to change view
- Added explanation in tooltip of action button when cannot build mining station or other base at location due to missing active design
- Fixed mined and known locations amounts sometimes being out-of-date in Resources list
- Fixed missing callout lines and tooltips in summary panel (bottom-middle of screen)
- Fixed height of text panel in Tour screen sometimes being too short
- Fixed some scrollable text panels missing their vertical scroll bar when text is higher than panel
- Ensure empires have different colors and flags even when multiple empires of same race
- Doubled the number of available empire flags
- Fixed non-clipped rendering artifacts in Start New Game screen
- Made galaxy nebula clouds more visible
- Fixed some text problems with fullscreen messages

COLONY MANAGEMENT
- Slightly adjusted planetary facility building levels, colony population and development should be larger before some facilities are built
- Reduced population level for building a small spaceport at a colony in default policy settings
- Increased target tax rate for medium-sized colonies to +20 (from +10) in default policy settings to encourage faster growth
- Ensure colonies always have proper resource stock levels for building bases and ships
- Avoid using reserved spending to build planetary facilities when automation is Suggest. Instead wait until have funds then suggest to player

EXPLORATION
- Ensure range for discovering lost colony exceeds exploration range so that exploration ships always discover
- Fixed new bug where exploration ships were sometimes stopping exploration beyond home system
- Slightly reduced tech level of ships in most debris fields
- Ensure abandoned ships and bases do not use excessive race-specific tech

GAME EVENTS
- Ensure plagues and disasters do not strike same colony too often (no simultaneous plagues, minimum interval between)
- Extended Game Events so that can have multiple filters for TriggerRaceIds and NonTriggerRaceIds
- Moved AllConditionsMustBeMet flag on Game Event and Actions (no longer part of Conditions list)
- Fixed minor text issue with some Hive threat messages
- Fixed minor text layout issues for some ruin discovery messages

IN-GAME EDITOR
- Changing a star name in game editor now also changes the corresponding system name on the galaxy map

MODDING SUPPORT
- Now support overriding loaded data items by Id value for all XML file types (Races, Research Project Definitions, Ship Hulls, Troop Definitions, etc) based on additional data files that start with the same name (as a prefix). IDs should still be unique across all files.

OTHER
- Fixed time to transfer character to new location sometimes being excessively long
- Ensure message filter empire flag images are properly loaded
- Ensure pre-expanded empire colonies (at game start) have good suitability levels
- Added setting to Game Settings screen for opt-in/out of auto-sending anonymized error reporting
- Auto-delete game settings to ensure new default policy settings are applied in new games
- Ensure SavedGames folder exists before using Continue Game button
- Enabled Sentry error reporting

- Included all files in win-x64 folder that may fix freetype.dll error issues some had when launching 1.0.6.4

DATA

- Various data file fixes, balance tweaks and updates, including some buffs for the Boskara and a fix for the Zenox starting with far too large a research bonus (the +20% was supposed to be only on their ancient homeworld, if you can find it)
- Rebalanced some government modifiers to make certain government types less corrupt and unhappy to ease economic challenges

v1.0.6.4 – 12th August 2022

ENGINE UPGRADE

- Upgraded engine to Stride 4.1.0.1, which requires .NET 6.0. Please see the important notes above.

RENDERING AND GAME SETTINGS

- Added Vulkan/DXVK rendering option in game settings
- Integrated new command line option to use DirectX11, which resets any registry settings to use DXVK. To use add /use-dx11 as a command-line argument to DistantWorlds2.exe
- Persisted some previously unsaved game settings (Control Center List item size, rendering option toggles)
- Auto-detect and warn when PC is missing a vendor-specific display driver (i.e. when only Available adapter is 'Microsoft Basic Render Driver')

PERFORMANCE IMPROVEMENTS

- Minor performance improvements in some areas
- Avoid precaching some models and textures when have low video memory
- Added some extra game settings to allow disabling some rendering effects
- Extended multi-threading to better utilize CPU cores and provide better performance
- Improved texture memory management to improve performance and further minimize crashes
- Enabled early exit from many multi-threaded tasks to provide more responsiveness in very large games when exiting to main menu or initiating load or save
- Improved performance when calculating construction yard wait times for incoming ships, thus improving responsiveness in very large games
- Improved rendering performance by implementing shader instancing when drawing galaxy map highlights (list items) and empire territory circles/lines. These improvements are especially evident in large games when zoomed out to the galaxy level
- Improved performance when opening very large lists in Control Center (e.g. civilian ships)

CRASH AND BUG FIXES

- Fixed various crashes relating to Stride rendering
- Fixed rare crash when resolving ship mission commands
- Fixed rare crash when calculating ship collision avoidance factors
- Fixed bug where location effects could sometimes linger for ships, disrupting subsequent movement
- Fixed crash when determining threat level for enemy ship
- Fixed crash when checking whether research project prerequisites have been researched
- Fixed rare crash when escorting target
- Fixed rare crash when calculating ship strength including fighters
- Fixed rare crash when drawing diplomatic relation details
- Fixed crash when click on non-item area of Resource Flow selection list
- Fixed rare crash when executing some game events
- Fixed crash when signaling docking completion for a ship
- Fixed rare crash when use planet destroyer
- Fixed crash when ship evaluates nearby threats
- Fixed issue where some older savegames could not be loaded
- Improved locking to reduce contention and fix crashes
- Fixed crash when checking ships within range at a location

- Fixed crash when finding shortest docking wait queue at a location
- Fixed rare crash when calculating jump path between systems
- Fixed crash when reviewing system visibility after ship exits hyperjump
- Fixed crash when drawing location badges
- Fixed rare crash when creating new colony
- Fixed crash when ship reviews its fleet escort
- Fixed crash when recording ship revert mission
- Fixed crash when checking for abandoned ships at location
- Fixed crash when fleet considers whether to retreat
- Fixed crash when updating system summary data
- Fixed rare crash when loading ship designs
- Fixed crash when calculating construction yard wait times
- Fixed crash when calculating stock levels
- Fixed crash when removing list items
- Fixed crash when merging temporary locations
- Fixed crash when resolving character location description
- Fixed crash when generating message log user interface
- Fixed crash when ship evaluates nearby threats
- Fixed rare crash when showing research screen
- Fixed rare crash while ship is determining system jump path
- Fixed a number of multi-threading-related crashes
- Fixed rare crash when processing ship movement and energy consumption
- Fixed crash when ship identifies nearby threats
- Improved context-locking for rendering to further reduce DXGI_ERROR_DEVICE_REMOVED errors
- Enabled capture of DirectX Debug information when switched on
- Improved error reporting with more detail
- Fixed rare crash when a ship refuels

UI IMPROVEMENTS

- Added text formatting to various messages
- Fixed some minor display issues with text layout
- Added further tooltips to Design List screen explaining Retrofit and Status columns
- Ensure that accepting a request to help another empire battle the Hive threat also ends any war between you
- Fixed sorting in Defensive Bases list for Name and Distance From Spaceport
- Added more detailed inline text formatting for markup language
- Extended text formatting to messages
- Updated Design List screen to more clearly indicate toggling for some items (underlines for Role Design, Auto Retrofit, Is Active columns)
- Added extra filter in New Mining Locations list: 'All Resources - No Asteroids'
- Improved selection of fleets and other items at galaxy level
- Added popup selection when click multiple items at same point
- Selection popup list is ordered by type, with fleets, stars and spaceports first
- Ensure player empire territory marked green (friendly) in Diplomacy map overlay
- Now include Autosaves for Continue Game button, i.e. if an autosave is the most recent savegame then that game will be resumed
- Better selection of default user interface size based on screen resolution (i.e. larger default size for larger screens)
- Fixed bug where ships sometimes could not be selected at system level
- Fixed Mining Locations list sometimes showing wrong items when filtering by a specific resource
- Properly filter out unknown resources in Colonies list
- Adjusted some galaxy map overlays so that properly fade out as zoom in (long range scanners, diplomacy, exploration)

- Adjusted general opacity for some map overlays (long range scanners, diplomacy, exploration)
- Added Continue Game button to main menu (load most recent savegame)

FLEET, SHIP AND STARFIGHTER BEHAVIOR

- Fixed ships sometimes incorrectly reassigning mission when get too close to planets
- Reduced collision avoidance contention when ships are docking at base, thus improving throughput
- Further extended logic for ships to avoid exiting hyperjump when mission changes: will now remain in hyperjump when change - mission to move to coordinates (at same location), even though do not have specific target
- Fixed fleet ships sometimes getting stuck in deep space unable to jump
- Fixed damaged fleet ships that cannot jump to repair location causing repeated fleet repair missions
- Improved fleet target selection so that do not upgrade attack against enemy ship to attack against entire fleet unless lead ship of enemy fleet is visible, thus better assessing whether need to refuel or gather before attack
- Now ensure ships always get properly refueled by fuel tanker, even when very close to planet
- Fighters now better at continuing to escort carriers when supporting ongoing Raid, Capture or Bombard missions (fighters no longer stop idle in space)
- Fixed bug where fleets were sometimes calculating fuel range incorrectly and thus taking on missions that were too distant
- Fighters now never allow collision avoidance to prevent them from boarding their carrier, thus avoiding holding up the carrier's jump, etc.
- Ships now remain in hyperjump when assign new mission if target is at same location as previous mission, e.g. thus have all fleet ships continue their jump to threat investigation location after first ship exits jump and upgrades mission to attack threat (no need to exit jump and then restart new jump)
- Added new ship mission type: Explore Location - explores all items at a location, useful for manually exploring asteroid fields. Select exploration ship and right-click on an item for popup menu with this mission
- Fleets no longer incorrectly refuel when assign prepare and attack mission against target outside a star system
- Default designs for medium and large freighters now have more fuel tanks to give greater range than small freighters
- Fixed bug where some ship/base retrofits were not completing properly, i.e. some new components were not being added
- Improved willingness of construction ships without hyperdrives to build new bases at own location
- Carriers no longer launch fighters when exit jumps at transit locations on way to final attack target, thus speeding up transit jumps (only launch fighters when real threats or arrive at final attack target location)
- Creating new fleet from multiple selected ships now also properly updates action buttons under Selection Panel to match new fleet

TROOPS AND TROOP TRANSPORTS

- Fixed some non-playable race troop sizes (were zero, thus very fast recruitment, etc).
- Ensure troop recruitment costs always paid, even when manually recruited
- Troops named with proper numeric prefix that relates to number of troop units in empire
- Infantry defense strengths increased
- Fixed automated non-fleet troop transports sometimes getting into endless loop of load/unload troops at a colony
- Troops at colonies now more likely to be ungarrisoned when not needed to meet defensive requirements or rebellion suppression (e.g. shortly after conquest), thus freeing them up for reloading on troop transports
- More careful auto-loading and unloading of troops for automated troop transports that are not part of a fleet. Avoid getting in endless loop of loading/unloading troops

DIPLOMACY

- Empires now properly decide whether to honor Defense Treaties, will consider whether to declare war on aggressors against their allies. Declining to honor treaty negatively impacts relations and reputation, whereas honoring the treaty (declaring war on aggressor) improves relations and reputation. When war diplomacy is not automated, player will be prompted with modal message window where they must choose whether to honor treaty or not
- Value of offer to end war with 3rd party in diplomacy trade deal screen now valued much lower. Other empire also has to be interested in an end to your war with 3rd party, i.e. they are friends with 3rd party and concerned about the war
- Non-Aggression treaties no longer offered when diplomatic strategy for a faction is set to Conquer
- Altered acceptance levels for diplomatic trade deals with other empires: angry empires require much higher value offered, friendly empires no longer offer very favourable deals
- Increased negative diplomatic incident amount from invading colonies, whether the colony is independent or owned by another faction. Negative incident amount now also scales with colony size, i.e. larger colonies generate stronger incident. However, when at war with faction then incident is much lower, as is negative reputation impact
- Increased negative diplomatic incident amount from colony bombardment. Note that this is not just a constant value, but rather is tied to actual amount of population loss
- Fixed bug where special locations could be traded repeatedly in Diplomacy trade screen
- Fixed bug where could not refuel ships at pirate bases when have Military Refueling agreement
- Ending a War or signing a Non-Aggression treaty now clears any dangerous locations for other empire, thus preventing automated fleets from unnecessarily investigating locations that are no longer a threat

SHIP DESIGN
- Ensure Upgrade Design button properly accounts for components that have matching category but not the necessary capabilities, e.g. Star Marine Barracks that are crew quarters category but are used differently

COLONIZATION AND SUITABILITY
- Ensure some story planets have proper quality levels to eventually become colonized by specified race
- Fixed automated colonization sometimes colonizing targets slightly below suitability threshold in empire policy
- Improved loading colonists for new colony targets so that load most suitable race even when is not dominant race at load colony
- Tweaked independent colony suitability for some races so that always have suitability of at least +20 (economically viable)
- Colony ships now less likely to retrofit and more likely to colonize any targets within range before refueling (i.e. do not refuel if already have colonization target within range)
- Improved willingness of automated Colony Ships to colonize queued colonization targets that are independent colonies but are unsuitable for empire races (does not matter because bulk of population is pre-existing well-suited native race)
- Fixed bug where too many colony ships were sometimes being built
- Fixed bug where colony ships could sometimes load the wrong race of colonists for queued colonization targets
- When Colonization Automation is manual, automated colony ships no longer load colonists except for queued colonization targets

CHARACTERS
- Better handling of imprisoned characters when reconquer colony (ensure properly removed from prisoners of previous empire)
- Properly exclude imprisoned characters when determining defensive bonuses at colony (as shown in Troop Report screen)
- Added extra tooltip descriptions for character traits Corrupt (Scientist) and Double Agent

MANUAL PLAY IMPROVEMENTS
- Added action buttons for multi-selected ships: scrap and retire selected ships
- Added new right-click mission for multi-selected ships: capture (when ships have capability)

AI IMPROVEMENTS

- Now properly handle situation when empire was planning to build expensive planetary facility at a colony, but lost colony while saving up construction funds

GENERAL BUG FIXES
- Now properly exclude ShipHulls_Art.xml file when not in art mode
- Fixed occasional error messages relating to regional settings on non-English PCs
- Fixed incorrect URL for .Net 6.0 installation

SOUND EFFECTS
- Limit number of simultaneous sound effects of same type to avoid very high effect volume, especially when first zooming into a location
- Further reduced simultaneous sound effects that can sometimes create loud bursts of sound
- Added Assault Pod sound effect
- Added shield strike and construction sound effects
- Fixed weapon firing sound effects not playing unless weapon also had accompanying particle effect

MODDING IMPROVEMENTS
- Added new Game Event features for story team
- Now allow loading multiple XML data files per type to better support modding
- Enabled IsPlayable flag in Races.xml file to better support modding. Note that races list in Start New Game screen does not scroll horizontally, so can currently only add 3-4 more races before disappear off right side of screen, but will add scroll support in future
- Added better support for custom mod-loading through command-line arguments
- Added extra checks with multi-file loading for mods, giving better feedback on data errors
- Implemented better approach for resetting static base data (loaded from XML files) when start a new game in same session (no longer reload from files), thus better supporting modding

OTHER
- Remove HighDPI aware registry flag for current user (no need for this as DW2 now handles this itself)
- Ensure correct infantry image always used in research screen for troop research projects
- Fixed scuttle button sometimes not working for single ships or bases
- Fixed story events sometimes being generated in the wrong location (e.g. ancient debris fields at homeworld)
- Fixed minor text formatting issues
- Ensure creatures move away from stars if too close
- Improved error reporting
- Improved profiling to enable frame capture using RenderDoc
- Improved error reporting in some situations
- Properly clear room background when speak with independent colony for non-playable race
- Capped maximum number of user-defined starting empires in Start New Game screen to 20
- Fixed a typo regarding the Technocracy government
- Military Academy facilities are now 1 per Empire as originally intended
- Refresh 'Continue Game' button tooltip with latest savegame when exit to main menu
- Properly refresh empire territory path lines after load game
- Fixed shift key sometimes not working when editing text
- Reduced volume for construction sound effects
- Fixed empires using independent flags
- Fixed reputation increase from destroying pirate ships and bases
- Fixed minor typo in game start text when have single additional colony
- Corrected Kiadian typo in diplomatic research projects
- Ensured proper game icon is shown in taskbar
- Added extra error reporting for some rendering-related crashes

v1.0.4.9 – 23rd June 2022
FLEETS, SHIPS AND FIGHTERS
- Fixed bug that was sometimes blocking some fleet missions when Military Attack automation was

manually controlled
- Prevent fleet ships from escorting their Core ships while they are still exiting construction/repair hangar
- 'Join ships to fleet' button now properly filters out any non-military selected ships when adding them to the fleet
- Fixed fighters sometimes using wrong weapons attack range (too low)
- Ensure fighters retain capture mission, assisting carriers to lower shields and capture target

CHARACTERS AND INTELLIGENCE MISSIONS
- Ensure character bonuses at location (colony, ship, fleet, base) only apply to characters from own empire (e.g. not foreign ambassadors)
- Altered intelligence mission difficulty thresholds so that spies more willing to attempt riskier missions. See updated tooltip for Mission Difficulty Caution in Intelligence Missions section of Empire Policy screen for new levels
- Ensure specified percentage of spies properly used for counter-intelligence (Counter Intelligence Ratio in Empire Policy)

SPACE CREATURES
- Ensure creatures do not get too far from horizontal plane (vertical offset)
- Ensure creatures do not go too close to stars, thus being difficult to attack

OTHER
- Research summary in header now shows when a project is being crash researched
- Extended research hover summary in header to also show queued research projects
- Fixed minor text display bugs in some game events
- Fixed Prime Research Station story event sending repeated messages when Suppress Messages turned on in game settings

v1.0.4.8 – 31st May 2022
This update includes many improvements in fleet coordination and fleet and ship behavior. Some of the issues addresses were due to bugs in the game, but others were due to confusion caused by unclear labeling or explanation on our part, which the below documentation and changes should resolve. Please read through the explanations below as well as the change list to fully understand how fleet and ship tactical settings are meant to function.

Fleet Engagement Range vs. Engagement Range
There is now Fleet Engagement Range (re-named) at the fleet level and Engagement Range at the ship level.
When a ship is in a fleet, the Fleet Engagement Range will override the ship's Engagement Range. The ship will only use its own Engagement Range when it is not in a Fleet.
The Fleet Engagement Range determines at a strategic level what missions/targets the fleet is in range of taking on. Previously, there was a gap at the system level where fleet and ship engagement ranges could conflict or override each other, which would result in the most restrictive of the two being used. That has been resolved. Now, if there is a target in the system and there is a fleet in the system with Fleet Engagement Range that would allow attacking within that system, the fleet will go attack that target as a fleet even if the individual ship settings would not allow individual ships to respond.

Manual Fleets and Military Attack Policies
It's important to note that a Manual fleet will not automatically respond outside of its own system. DW2 assumes that a Manual fleet is fully under manual orders for anything out of system. If you would like a fleet to automatically respond outside of its own system, it needs to be set to one of the Automatic fleet roles (for example, Attack or Defend) and its Fleet Engagement Range must allow it.
Also, if you have your Military Attacks Policy in the Military section of your policies set to Manual, then no fleets of any kind will respond or attack outside their own systems without being manually ordered to do so.
In order to have fleets fully responding outside their systems, you need to have:

1. Fleet Engagement Ranges set to allow it
2. Each Fleet needs to be set to one of the Automatic roles
3. The Military Attacks policy cannot be set to Manual

By default, all these things are true, but if you have changed these settings please be aware of their intended interactions and results.

Fleet Attack Stance
This was no longer performing any necessary function given the other settings and their capabilities. It was however adding confusion for players, so it was removed.

Fleet Retreat Strategy
There was an issue preventing this working as intended, which should now be resolved. It should also be noted that this has a different function than the Retreat When setting at the ship level. It was therefore renamed to Fleet Retreat Strategy to avoid confusion.
Fleet Retreat Strategy affects when the entire fleet will consider changing orders to escape a location based on overall strength comparison at that location. Individual ships will still follow their Retreat When setting in terms of responding to damage caused to that ship.
Note that Manual fleets will not at this time retreat as a fleet unless ordered to do so by the player. This is working as intended, as we generally lean towards manual meaning that the player has full control and gets to decide when the fleet retreats. All automated fleets will respect the Fleet Retreat Strategy.

Position within Fleet
We realized that the previous UI terminology used "Role" in two different instances. Role now refers only to the general type of ship (i.e. Frigate, Destroyer, Cruiser).
The position of a ship in a fleet within the fleet formation is now more intuitively called "Position within Fleet" in the ship's tactical settings. The previous "Attack" has been renamed to "Core" to make it more clear that this position is in the center of the fleet, whereas "Close Escort" is the inner ring and "Picket" is the outer ring of the formation. In most cases, we recommend placing your point defense-oriented ships in the Picket or Close Escort positions and keeping your most valuable Capital ships and long-range standoff ships in the Core.

Ship Tactical Setting Apply Buttons
We recognized that the importance of the tactical settings at the ship level was not matched by the UI in terms of the ease of adjusting them post-construction. There are now three new buttons available for any ship in a fleet:
- Apply these tactical settings to all ships of this design in the fleet
- Apply these tactical settings to all ships of this role in the fleet
- Apply these tactical settings to all ships of this position in the fleet
- Apply these tactical settings to all ships in the fleet

This only affects the ship level tactical setting. You can see these by selecting a ship that is in a fleet and looking at its tactical settings.
We also plan to add the ability to mass apply tactical setting changes whenever multiple ships are selected through any method in the future.

PERFORMANCE IMPROVEMENTS
- Improved general performance, especially in very large late-game galaxies
- Fixed rare bug that was sometimes slowing general game performance
- Improved performance when calculating construction yard wait times, especially for large games
FLEET AND SHIP BEHAVIOR
- Fixed Prepare and Attack fleet missions to properly evaluate need to refuel
- Fleets now more permissive when evaluating Prepare and Attack missions. If sufficient fleet ships in target system and can handle attack against target then less inclined to first refuel or gather. In other words, now more likely to attack targets in same system directly without first refuelling or gathering, even when some fleet ships are dispersed or need refuelling

- Fleets now wait for all fighters to board carriers before hyperjumping
- When preparing to hyperjump, carriers now move more slowly while waiting for all fighters to board, thus making it easier for fighters to catch up with carrier
- Fighters boarding carriers now move at maximum speed when returning to carrier from far away
- Fixed fighters sometimes incorrectly boarding carriers and then immediately relaunching
- Fleets now more careful to have enough available ships when auto-assigning attacks against targets
- Fleets more careful about completing attack missions (e.g. raid) when all fleet ships have completed the mission type
- Ensure disable action buttons when select fleet of another empire
- Fixed some additional situations where fleets would not engage threats properly
- Broadened Guard mission so that fleets/ships will engage threats at same location, even when threat is not currently attacking guard target
- Fixed bug where fleet engagement range was sometimes not properly overriding ship engagement range
- Ensure fleets properly use fleet engagement range when evaluating whether to attack targets (i.e. do not downgrade to use each ship's engagement range)
- Manually assigning refuel/repair/retrofit missions to automated fleets no longer immediately changes their role to Manual. All other mission types remain the same and will automatically change their role to Manual if currently automated (Attack, Defend, Raid, Invade)
- Fixed bug where fleets would sometimes not engage threats, even when within engagement range
- Ensure that automated fleets do not get caught in attack/retreat loop
- Fixed manually assigning Guard missions to fleets sometimes not being assigned to individual fleet ships
- When investigating dangerous locations fleets are now more careful to ensure have adequate strength to handle expected threats
- Ship missions that require docking at a colony (e.g. load/unload troops, load/unload colonists, etc) now more flexible about ship position, does not necessarily need to move to new position if already close to planet. This change helps these mission types complete faster
- Troops reserved for pickup by troop transport now immediately unreserved when transport destroyed (previously took a few seconds)

FLEET AND SHIP TACTICAL SETTINGS
- Removed unused Fleet Stance tactical setting
- In Tactical Settings dialog, the orange warning highlight for Fleet Engagement Range when the Military Attack policy is manually-controlled (thus disabling auto fleet engagement) is now used even when selected fleet is automated
- Updated Galactopedia topic for Tactical Settings to reflect updated ship and fleet tactical terminology and functionality
- Added comprehensive tooltips explaining each item in the Tactical Settings screen
- Ensure Tactical Settings dialog closes when select ship or fleet of another empire
- Clarified wording of explanations for Fleet Engagement Range in Galactopedia and Tactical Dialog tooltips (manual fleets auto-engaging within current system)
- Added tooltip to explain that Fleet Retreat tactical setting is not used by manually-controlled fleets
- Added tooltip to Fleet Engagement Range to explain when this is used by fleets
- Changed labeling for some fleet tactical settings for extra clarity
- Ensure Tactical Settings dialog not displayed when open Ship Design screen
- To reduce confusion role in ship tactical settings has been replaced with position within fleet
- Added extra 'Apply Settings' buttons to Tactical Settings dialog when displaying tactics for ship that is part of a fleet: allow applying settings to all fleet ships with same role, design, position in fleet.

FUEL TANKERS
- Automated Fuel Tankers in a fleet are no longer set to manual control when you set their fleet to Manual or when manually assign a fleet mission. This allows Fuel Tankers to remain automated

and auto-delivering fuel to the fleet ships while the rest of the fleet is under manual control. Note that you can still set fleet Fuel Tankers to manual control when individually selecting them

- Ensure properly exclude fuel tankers when generating action button for fleet retrofit (fleet fuel tankers operate independently and retrofit on their own schedule)
- Automated Fuel Tankers now retrofit and repair as needed even when assigned to a fleet
- Additional tweaks to Fuel Tanker evaluation of when to refuel various ship roles, e.g. exploration ships now not refueled until lower fuel level, thus spending less time waiting for fuel tankers
- Fuel Tankers now periodically check whether target ship still needs refueling, cancelling mission if needed
- Fuel Tankers no longer refuel other Fuel Tankers unless they are completely out of fuel (including no fuel in cargo)
- Fuel Tankers more careful to avoid locations that have damaging storm effects that they cannot handle
- Fuel Tankers now more careful to avoid attempting to refuel ships that will soon enter hyperspace, instead prefer idle ships or ships that have already reached mission destination
- Fuel Tankers now more careful to avoid traveling to hostile locations when attempting to join up with fleet. Will instead move to nearby location free of threats
- Ensure Fuel Tankers can refuel ships even when in deep space far from any normal location

COLONIZATION, MIGRATION AND TOURISM

- Improved selection of queued colonization targets by existing colony ships that already have population loaded. Will now also unload population if necessary so that can load more suitable population from existing colonies
- Added new mission type to unload passengers for colony ships with colonists onboard. Access by selecting colony ship and right-clicking on one of your empire's colonies for pop-up mission list
- Altered auto-assigned migration missions to prefer higher suitability destination colonies
- Now exclude Colony Ships as available to colonize new colony while loading colonists (assign mission button in New Colonies list)
- When colonization range limits are enforced (game startup settings) now use straight-line distance to evaluate whether potential colony is in range of existing colonies (instead of path time, which caused issues when potential colonies were in nebulae)
- Fixed bug where colony ships would sometimes load wrong race as colonists
- Further improved race selection for new colonies, even for independent colonies, i.e. attempt to use most suitable race
- Further improved automated selection of colonizing race for Colony Ships based on queued and non-queued colonization targets (i.e. attempt to select most suitable race for new colonies). This applies even when you have custom population policies at your colonies that would otherwise prioritize other races for pickup (e.g. Resettle)
- Now prevent unloading colonists at colonies that cannot accept them due to either blocking population policy (e.g. Do Not Accept) or colony already being at maximum population
- Disabled ships (cannot move) no longer count as threats and thus do not show up on threats list or block colonization or construction at the location
- Tourism missions now properly ignore colony population policy settings (tourism to destinations with policy of Do Not Accept, etc)
- Ensure tourism destinations are selected more evenly by passenger ships (resort bases + scenic colonies)

ECONOMY, COLONIES, RESOURCES AND CONSTRUCTION

- Colony corruption and support costs now scale similarly to colony revenue beyond 50% maximum population. This means that net colony revenue no longer decreases as population increases, though it will increase much more slowly.
- Reduced luxury resource consumption rate at colonies by 33% to improve resource logistics across a variety of galaxy map settings and resource prevalences
- Reduced default stock level for fuel storage at mining stations
- Ensured spaceports not at colonies have more storage space and higher stock levels for fuel and construction resources
- Freighters transporting resources to locations now allow some over-delivery of amounts beyond

cargo capacity for each resource. This especially improves efficiency for locations that are space-constrained and thus have stock levels the same as the cargo capacity (e.g. mining stations, research stations)

- Ensure resource ordering for colonies and bases requests excess amount above stock levels to reduce frequency of reordering and thus reduce freighter demand
- Fixed bug where destinations were sometimes failing to receive resources via freighter
- Added warnings to New Colonies list and Selection Panel indicating when a planet has low suitability for colonization and the economic consequences
- New resources are now properly discovered and used when you acquire a ship or base with the previously unknown resource in its cargo (e.g. abandoned base, story event, etc)
- Fixed bases built at independent colonies (e.g. research stations) incorrectly using cargo, stock levels and cargo capacities of parent colony (should only do so when parent colony is own empire)
- Ensured Resources and Stock Levels dialog does not incorrectly indicate that some resource amounts on hand are below the stock level
- Resources and Stock Levels dialog now includes explanatory note about foreign sources in tooltip for Mined and Known Locations
- Colonies now always attempt to stock super luxury resources when available (Korabbian Spice, Loros Fruit, Zentabia Fluid), even when they can meet their target development level through other, more accessible luxury resources
- Ensure automated construction does not build too many ships at once (minimize big swings in cash on hand, etc)

EMPIRE BONUSES
- All maintenance savings bonuses now applied by dividing by (1 + bonus amount) instead of multiplying by bonus amount (ship maintenance, troop maintenance, planetary facility maintenance). This means that maintenance savings can never be greater than full maintenance costs (no negative maintenance)
- Fixed some bonus types being applied incorrectly (TroopRecoveryRate, ShipEnergyUsage)
- Ensure that empire-wide bonuses from research are properly integrated into overall empire bonuses (e.g. Troop Maintenance Savings from Improved Logistics project, etc)

CHARACTER SKILLS AND DIMINISHING RETURNS
- Character skills at a location are now applied with diminishing values. Thus the best character for a skill applies 100% of their skill level, but all subsequent characters only apply a steadily diminishing proportion of their skill for that area (thus 100%, 50%, 25%, etc). This means that is is often better to spread characters across multiple locations instead of concentrating them at a single location, e.g. admirals and generals in multiple fleets, scientists in multiple research stations, etc.
- Updated Galactopedia topic Characters to explain diminishing character skills for a location
- Slowed growth of character skill levels

INTELLIGENCE MISSIONS
- Decreased success chance for intelligence missions. Diminishing value begins at 75% instead of previous 90%. Thus spies must have much higher skill levels to reach high success chance

SHIP DESIGN IMPROVEMENTS
- Tweaked default design templates for colony ships and troop transports to maximize chance of sufficient reactor energy output to power hyperdrives at full speed and thus extend travel range
- Further improved auto-design for troop transports to maximize fuel range by ensuring hyperdrives have full reactor energy supply
- Fixed faulty weapon damage graph for tractor beams in Ship Design screen

EXPLORATION
- Fixed exploration ships sometimes pausing exploration of home system when have not yet found fuel source
- Fixed black hole vortex range so that exploration ships can properly complete mission

OTHER CHANGES
- Suppress incorrect initial mouse-up when enter research screen from main view header (would sometimes incorrectly queue the hovered research project)

- Fixed text display bug for colony events reported as Galaxy News (Patriotic Wave, Predictive History, etc)
- Limit maximum number of items displayed in Summary View (bottom-middle of screen) at galaxy level (colonies, spaceports, fleets) to ensure that on lower resolution displays this does not become overwhelming in the late game
- Altered Ghost Fleet Base story event to always be generated at location with fuel source
- Ensure raid countdown processed for bases

ART BUNDLE CHANGES
- Fixed various issues in the art bundles with incorrect texture sizes as well as uncompressed or unstreamed texture settings
- Substantially reduced texture memory usage for creatures, nebulae and effects

v1.0.3.7 – 22nd April 2022
- Improved general performance, especially in very large games
- Reduced likelihood of hangs before autosaving
- Added fix for rare memory corruption when animating space creatures
- Further adjustments to some map overlays to improve performance (long range scanners, exploration, diplomacy)

v1.0.3.6 – 19th April 2022

CRASH FIXES
- Fixed crash when adding diplomatic incident
- Fixed crash when updating ship engine exhaust
- Fixed crash when calculating ship collision avoidance
- Fixed crash when resolving character mission location description
- Fixed crash when drawing troop summary
- Fixed crash when determining resource prices
- Fixed crash when determining fleet systems within engagement range
- Fixed crash when evaluating threats to ship or base
- Fixed crash when fixing ships in a location
- Fixed crash when updating location for fighters onboard a carrier
- Fixed crash when rendering message
- Fixed crash when firing weapons
- Fixed crash when rendering character traits
- Fixed crash when determining retrofit resources for a ship or base
- Fixed crash when finding nearest refuelling point
- Fixed crash when drawing empire relation in diplomacy screen
- Fixed crash when determining empire mining targets
- Fixed rare crash when loading some older savegames
- Fixed crash when switching camera modes

SYSTEM BADGES AND MAP OVERLAYS
- Fixed clickable regions for new basic system badges
- Ensure map buttons retain highlight state when apply changes to graphics settings
- Altered map overlay buffer format (long range scanners, exploration, diplomacy) to improve overlay opacity and visibility

SAVEGAMES
- Updated autosave timer logic to ensure save at specified intervals. Reminder that paused time does not count towards autosave interval
- Now check for low disk space when saving game and send warning message if needed
- More graceful handling of savegame failures for whatever reason

OTHER
- Fixed slow initial zoom-in when start new game
- Now purge old low-priority empire messages
- Altered texture streaming memory budget to be more generous when no shared system memory

allocated
- Waypointing ships now properly slow to a stop while waiting for other fleet ships to arrive
- Fixed bug when performing jump pathfinding
- Fixed colony bombardment ship range when colony has long range defensive weapons (previously ships were too cautious to approach colony when tactics were Evade)
- Updated values for planetary shield facilities
- Data fixes to allow planetary destroyer to be built again

v1.0.3.5 – 14th April 2022

CRASH FIXES
- Reworked some rendering to further minimize DXGI_ERROR_DEVICE_REMOVED crashes
- Fixed crash when evaluating threats
- Fixed crash when calculating location visibility level
- Fixed crash when rendering research screen
- Fixed crash when examining recent trade deals
- Fixed crash when extracting resources
- Fixed crash when identifying independent repair bases
- Fixed crash when fulfilling resource orders
- Fixed crash when sorting items while determining mining targets
- Fixed crash when executing action
- Fixed crash when calculating construction yard wait time
- Fixed crash when identifying refuelling points
- Fixed crash when rendering ship or base summary
- Fixed crash when drawing construction yard summary
- Fixed crash when updating ship engine exhaust
- Fixed crash when preparing ship for retrofit
- Fixed crash when changing ship empire
- Fixed crash when obtaining fleet template designs per role
- Fixed crash when auto-assigning scout mission to exploration ship
- Fixed crash when launching assault pod
- Fixed crash when updating user interface controls
- Fixed crash when refreshing graphics setup
- Fixed crash when checking whether ship is in battle
- Fixed crash when checking for appearance of hive threat
- Fixed crash when completing ship command
- Fixed crash when planet removed in game editor
- Fixed crash when calculating ship collision avoidance
- Fixed crash when drawing system exploration data
- Fixed crash when drawing system summary
- Fixed crash when editing bonuses in game editor
- Fixed crash when drawing research button
- Fixed crash when updating tourism/migration/resource flow data
- Fixed crash when adding diplomatic relation incident
- Fixed crash when rendering creature effects
- Fixed crash when rendering map overlay buttons
- Fixed crash when reviewing army templates
- Fixed crash when updating character bonuses
- Fixed crash when processing ships and bases
- Fixed crash when inflicting ion damage from nebula storms
- Fixed crash when removing weapon blast from location
- Fixed crash when ship unloads passengers
- Fixed crash when generating new character

PERFORMANCE IMPROVEMENTS

- Added new default system badge mode (Basic) with smaller, simplified badges when zoomed out to galaxy level. Extended mode is same as previous Basic mode

OTHER CHANGES
- Fixed Load Fleet Template dialog to properly load from FleetTemplates sub-folder (same folder as Save Fleet Template)
- Exploration and diplomacy map overlays now auto-enable when in relevant UI area
- Long range scanner, exploration and diplomacy map overlays now more opaque
- The resource and credit discount on Planet Destroyer hulls has come to an end
- Ship hull fixes for certain freighters and transports
- Fixes to component data typos and some tweaks some of which affect the permissible slot sizes for certain late game weapons
- Additional story event fixes
- Fixes for some facility upgrade issues due to incorrect IDs in the facility data

v1.0.3.4 – 8th April 2022

CRASH FIXES
- fixed crash when building facility
- updated Harmony library to resolve some problems

PERFORMANCE IMPROVEMENTS
- improved general performance relating to fleet operations
- fixed occasional hang when fleets bombard colonies
- fixed occasional performance 'stuttering'
- fixed ship movement sometimes being jerky when zoom into same location
- improved rendering performance for map overlays: exploration, diplomacy long range scanners

v1.0.3.3 – 6th April 2022

CRASH FIXES
- fixed bug where economy line items were often not being updated (introduced in 1.0.3.1)
- added fixes to greatly reduce number of DXGI_ERROR_DEVICE_REMOVED crashes
- fixed crash when fleet evaluates whether to invade colony
- fixed crash when ship fires intercept weapons
- fixed crash when determine empire migration sources
- fixed crash when getting native creature habitats
- fixed crash when updating user interface controls
- fixed crash when updating ship engine exhaust
- fixed crash with sorting when finding nearest refuelling point
- fixed crash when drawing empire relation
- fixed rare crash when drawing troops and characters
- now handle access denied error when saving game settings or game start settings files

PERFORMANCE IMPROVEMENTS
- slightly improved general performance

ADDITIONAL CHANGES
- added Harmony modding support to DW2

v1.0.3.1 – 4th April 2022

CRASH FIXES
- fixed crash when ship performs collision avoidance
- fixed crash when ship determines large items to avoid
- fixed crash when completing spy mission
- fixed crash when finding nearest refueling point
- fixed rare crash during rendering
- fixed rare crash when generating tool tips
- fixed rare crash when investigating abandoned ships or bases
- fixed crash when drawing animated characters

- fixed crash when creature moves to new location
- fixed crash when evaluating threats
- fixed crash when rendering system badges
- fixed crash when ship destroyed
- fixed crash when assigning ship mission
- fixed crash when rendering ship and base symbols
- fixed crash when updating empire territory
- fixed crash when ship exits hyperjump
- fixed crash when rendering effects
- fixed crash when identifying refueling points
- fixed crash when reviewing fleet escort ships
- fixed crash when ship is refueling
- fixed crash when finding fastest construction yard
- fixed crash when determining blockaded locations
- fixed crash when artifact changes location
- fixed crash when notifying empire of attack
- fixed rare crash when add display effect
- fixed rare crash when rotating stars and planets
- fixed crash when moving weapon blast
- fixed crash when updating nebula storm clouds
- fixed crash when ship or base destroyed
- fixed crash when showing message
- fixed rare crash when ship fires weapons at attackers
- fixed crash when adding resource/tourism/migration flow data
- fixed rare crash when generating tool tips
- fixed crash when drawing nebula storm clouds
- fixed crash when ship or base destroyed
- fixed crash when directing fleet escorts
- fixed crash when updating nebula cloud rendering
- fixed crash when resolving trade offer description
- fixed crash when getting fleet jump speed
- fixed crash when processing ship
- fixed crash when processing location effects
- fixed crash when checking for active hyperdeny at a location
- fixed crash when generating task to queue construction of a base at a location

v1.0.3.0 – 1st April 2022
CRASH FIXES
- Fixed rare crash when evaluating collision avoidance factors
- Fixed rare crash when assigning ship mission
- Fixed rare crash when determining whether to accept treaty
- Fixed rare crash when checking whether a fleet should retreat from a battle
- Fixed crash when obtaining ruins and wonders at a location
- Fixed crash when drawing research project summary
- Fixed rare crash when ship or base fires weapons at attackers
- Fixed rare crash when colony conquered by invasion
- Fixed rare crash when selecting random resource
- Fixed rare crash when determining diplomatic strategies with other empires
PERFORMANCE IMPROVEMENTS
- Improved rendering performance when in research screen
OTHER CHANGES
- Additional data fixes for certain small troop transport ship hulls and certain artifacts

v1.0.2.9 – 31ˢᵗ March 2022
CRASH FIXES
- Changed how colony city night lights are handled to minimize video memory usage
- Improved game update cycle to eliminate possible threading issues during game saves
- Fixed crash when evaluating ship boarding status
- Fixed rare crash when ship or base fires weapons
- Fixed rare crash when finding nearest refuelling point
- Fixed rare crash when colony wiped out
- Now more careful with handling missing game settings files

ADDITIONAL LOGGING
- Added functionality to automatically send crash logs to dev team (prompts player to send in next game session)

OTHER CHANGES
- Now display message to indicate when auto-saving the game
- Fixed cluster galaxies sometimes generating star systems outside playable area
- Data fixes to certain ship hull data typos for troop transports and some stations
- Data fixes for various story event issues
- Research project tree fixes for various fallback and prerequisite paths, mainly to fix the armor tree
- Defensive bases can now be research one Tech Level earlier on the Research Tree

v1.0.2.8 – 28ᵗʰ March 2022
CRASH FIXES
- Fixed savegame corruption when save while expired messages are being purged (note that some past saves were corrupted and if these do not load in 1.0.2.8 they are unrecoverable)
- Fixed hang on save due to fighters incorrectly taking their parent carriers 'Prepare and Attack' missions
- Fixed rare crash when iterating fleet ships
- Fixed rare crash when sending message to empire
- Fixed rare crash when iterating empire messages
- Fixed crash when clearing pursuers from target

RENDERING FIXES
- Changed how vertex buffers are handled to reduce video memory usage and reduce crashes
- Now more carefully check for missing buffers when rendering shield impact effects

FLEETS AND SHIPS
- Now take more care to ensure nearby ships are added to fleets, thus better preserving fleet cohesion
- Exclude ships with manually assigned attack missions when determine whether to break off attack against a target (target jumps outside engagement range or fuel range, etc)
- Fleets and ships now better at retaining attack missions against targets that jump to another location, especially when target remains in same system
- Fixed bug blocking direct attack fleet missions
- Shortened wait time before attacking when fleets regroup at a waypoint (Prepare and Attack), i.e. fleets commence attack phase faster once reach waypoint

OTHER
- Ensure freighters with short hyperdrive jump range are not selected for distant transport missions (should fix freighters with Skip Drives sometimes dumping cargo)

v1.0.2.6 – 25ᵗʰ March 2022
CRASH FIXES
- Adjusted how some vertex buffers were created to improve stability (more to come on this)
- Fixed bug where shield impact model vertices were sometimes setup incorrectly
- Fixed rare crash when ship is turning
- Fixed rare crash when initiating particle effect
- Fixed rare crash when assigning ship mission

PERFORMANCE IMPROVEMENTS
- Increased multi-threading support for some game logic, improves performance, especially for large late-games

FLEET AND SHIP COORDINATION IMPROVEMENTS
- Added full Prepare and Attack missions for fleets (attack, raid, capture, bombard). This is the default right-click fleet attack mission type and will also be used by automated fleets. Fleets will now automatically refuel (when need fuel) or waypoint (if need to regroup) before undertaking their attack mission. If they do not need refuelling or regrouping then they will attack the target directly. When refuelling or regrouping the fleet will synchronize their final jump to the attack target.

v1.0.2.4 – 23rd March 2022

CRASH FIXES
- Fixed game hang that was causing saves and loads to fail
- Fixed rare crash when applying nebula effects to ships
- Fixed rare crash while initiating particle effects

PERFORMANCE IMPROVEMENTS
- Altered asset streaming timeout to reduce video memory usage

FLEET AND SHIP FIXES
- Now exclude ships that cannot jump when determining fleet jump speed (previously was blocking some missions)
- Improved logic for fighters boarding their carriers when the carrier is preparing to jump. Normally when carrier is jumping, they will wait for fighters to board, unless very distant. But when carrier is escaping then fighter boarding time is reduced and fighters may be left behind (destroyed)
- Improved performance of exploration ship mission selection when in late-game and most systems explored
- Fixed bug where ships were sometimes overcautious about travelling to locations with effects, e.g. black holes with ranged damage effects

OTHER FIXES
- Reenabled maximum research queue limit of 15 projects

v1.0.2.3 – 22nd March 2022

CRASH FIXES
- Added extra error-handling for DXGI_ERROR_DEVICE_REMOVED errors when display adapter resets
- Added delay after applying changes to display settings or encountering DXGI_ERROR_DEVICE_REMOVED adapter reset error
- Fixed profiling data not reenabling once disabled
- Ensure Steam API updated each frame

v1.0.2.2 – 21st March 2022

CRASH FIXES
- Fixed some further DXGI_ERROR_DEVICE_REMOVED errors
- Fixed crash when calculating population defend strength at a colony
- Fixed crash in Abandoned Ship and Bases list when use sort 'Distance from Spaceport'
- Fixed rare hang when ship attack mission gets stuck

RENDERING
- IMPORTANT CHANGE: Changed default back buffer format to use Standard Range rendering. This may help some who are experiencing black screens at startup, _but it will also reduce the quality of some visuals_. If you were not previously having problems with black screens or crashes then you can revert to High Dynamic Range rendering in the in-game Game Settings to restore the visuals to their previous quality.
- Improved performance when long range scanner map overlay enabled

TROOPS
- Changed meaning of colony automation setting 'Automate Infantry Recruitment and Garrison' to

now include all troop types, i.e. 'Automate Troop Recruitment and Garrison'
- Lowered attack troop recruitment levels, especially for large empires
- Added automation icons to Selection Panel to indicate colony automation status for troop recruitment and resource stock levels

HIVE AND PLANET DESTROYER
- Added diplomatic incident and reputation impact from using planet destroyer against colonies
- Improved movement of planet destroyer ship to better avoid clipping planet surfaces
- Capped maximum bonus levels for Hive ships when salvage debris or raid colonies and bases

OTHER
- Improved calculation of optimal attack range against targets based on weapon ranges (ship/base attacks and bombarding colonies)
- Reviewed policy setting for intelligence mission caution so that aligns with revised mission difficulties. Tooltip explains success chance per level
- Empire systems no longer start inside nebulae
- Fixed occasional faulty ETA display for transferring artifacts
- Fixed population policy window not scrolling with mouse wheel when colony detail panel also open
- Fixed blank or incorrect startup colony and base stock levels when colony stock level automation is manually controlled
- Additional data fixes for a few missing weapon sounds, certain missing component/hull resource costs, a few event fixes

v1.0.2.1 – 18th March 2022

CRASH FIXES
- Fixed rare crash when rendering empire territory
- Fixed rare crash when scrapping advanced ship with tech bonus, but your empire has not yet researched a relevant project
- Fixed rare crash when calculating military ship strength
- Fixed rare crash when evaluating threats to a ship

RENDERING CRASH HANDLING
- More graceful recovery when texture or vertex buffer creation fails due to display adapter crash, reset, or change in performance mode. This should greatly reduce the number of DXGI_ERROR_DEVICE_REMOVED crashes

DIPLOMACY
- Improved diplomacy so that relations now more likely to rise to higher levels (top-level treaties) when you work at improving relations with a faction. Remember that you can directly set diplomatic strategy per faction, which will also help improve relations (Befriend, Ally, Close Ally)

FLEETS AND SHIPS
- Fixed bug where ships and fleets could sometimes teleport to edge of galaxy when assigned a mission while already jumping
- Fleet jump speed coordination now applies to all fleet missions, not just attack missions (ships travel at same jump speed)
- Fuel Tankers no longer use fleet jump speed when part of a fleet

OTHER
- Now properly review maximum colony population level as tech improves (colonization modifiers) and planet quality changes (terraforming, etc). This fixes issues with migration missions sometimes not completing
- Ensure that player's per-role ship design automation settings are reset between each game (not remembered from previous games)
- Fleet Template screen no longer generates empty fleet when do not have enough money to build
- Ensure scroll position in Empire Policy screen is reset to top when open again (previously settings were sometimes not appearing until scrolled up)
- Reduced estimated resource demand for fuel so that more accurately aligns with actual usage
- changed default game start settings for research to fixed paths and colonization range limit to

300M
- Data fixes and changes to correct resource costs for some components/hulls with no resource costs or incorrect costs
- Added missing fallback paths for some armor techs
- Fixes for some story event issues
- Extended range for dedicated bombardment weapons
- Simplified main menu scene to assist with consistent startup crash troubleshooting

v1.0.2.0 – 15th March 2022
DISPLAY AND RENDERING
- Reduced asset streaming memory budget to allow more memory for other rendering
- Fixed bugs when auto-detecting display mode with highest refresh rate
- Reenabled fixed timestep updates
- Added more logging to data/SessionLog.txt file: display adapter selection (including primary monitor detected), display modes, galaxy settings
- Added new setting to GameSettingsOverride.txt: GraphicsStreamingMemoryBudget allows specifying video memory in Mb allocated for asset streaming
- Added new setting to GameSettingsOverride.txt: DisableFixedTimeStep: when set to true allows disabling fixed time step (higher FPS, but also higher GPU temperatures and power usage)
CRASH FIXES
- Fixed crash when determining attack targets
- Fixed rare crash when sorting some lists in Control Center
- Fixed rare crash when opening Research screen
- Fixed rare crash when determining locations for new monitoring stations
- Fixed rare crash when changing map overlays
INTELLIGENCE MISSIONS
- Increased difficulty of some intelligence missions, especially steal tech when targeting higher level research projects
- Altered how intelligence mission success chance is calculated so that always a chance of failure (even without counter-intelligence)
- Slightly increased effectiveness of counter intelligence missions (more likely to intercept enemy spy missions)
OTHER
- Fixed bug where default keyboard settings were sometimes not being generated at game startup
- Fixed bug where ships would avoid bombarding a colony that had imprisoned characters
- Fixed bug where invading characters that were killed at a colony were sometimes not removed from the colony
- Avoid executing advisor messages twice when automation is set to Suggest and Execute, e.g. building planetary facilities
- Data fixes to various events, facilities, research projects, ship hulls and artifacts (only available with a new game)

v1.0.1.9 – 14th March 2022
DISPLAY AND RENDERING
- Fixed faulty display resolution detection at game start
- Improved resolution of correct display adapter when specific adapter requested
- Disabled fixed timestep updates (higher FPS)
- Allow toggling on-screen FPS and other rendering data using shift-Tilde (top-left corner of most keyboards), which allows seeing which display adapter is being used
CRASH AND HANG FIXES
- Fixed crash when empire has revolution and changes government
- Fixed hang where fighters at colonies would lock up when their parent colony was wiped out
- Fixed hang where exploration ship attempts to explore a location that has nebula sensor disablement that exceeds its scan power

EXPLORATION
- Asteroids are now explored much quicker than planets, moons or stars (for both scan and survey)
- Ensure all necessary resources in prewarp home system are discoverable at initial tech levels, even when already present

DIPLOMACY
- Reduced envy factor in diplomacy when have positive diplomatic strategy for other faction ('We are envious of your huge strength and power')
- Envy factor in diplomacy now grows more gradually

OTHER
- More careful about evaluating systems inside nebulae and related logic
- Rebalanced loading of game processing for large games with many ships
- Fixed ships sometimes getting stuck salvaging debris when has bonuses but came from one of own empire's ships
- Construction ships now more careful to avoid building at distant locations (even in same system) when do not have hyperdrive
- No longer generate error sound and effect when move mouse off scrollbar while scrolling a panel or list

v1.0.1.8 – 13th March 2022
- Improved handling when graphics device is reset
- Improved auto-detection of default screen refresh rate
- Ensure file save/load dialog is shown even when hide user interface
- Added new GameSettingsOverride.txt file to allow manually setting graphics adapter, resolution, windowed mode. This should be a handy way for players to set stuff directly. Comments in file explain everything. Changes as below:
- Extended new GameSetting Changes as below:
- Extended new GameSettingsOverride.txt file to allow forcing game to run in exclusive fullscreen mode (GraphicsForceDedicatedFullScreen)
- Added startup logging for game session (data/logs/SessionLog.txt)
- Reenabled Windows registry settings for requesting high performance GPU mode
- Improved calculation of content streaming memory budget on systems with multiple graphics adapters
- Improved memory management for rendering in various situations

v1.0.1.6 – 11th March 2022
- Fixed crash that sometimes happens when have many game controllers and other devices
- Fixed User Interface Size showing options that are invalid for the current screen resolution
- Improved handling of High DPI settings in Windows
- Added settings to ensure NVidia video cards run in high performance mode should fix a number of crashes and performance problems
- Fixed rare crash when moving characters via dropdown list in Character screen
- Fixed rare rendering crash
- Fixed rare crash when ship design could not be found when updating render data
- Improved performance at location level when many ships and lots of running lights
- Fixed bug in Start New Game screen where could select race-specific government types when select random race
- No longer prevent construction ships from carrying out base-building when waiting for response on advisor suggestions for repairing abandoned ships or bases
- Hooked up instability and unhappiness after a government change, leader loss, etc ('Have Revolution' button)
- Construction ships no longer feel tempted to repair fighters
- Fixed bug in some game events that was causing loss of a colony
- Fixed wrong tooltip text on buttons in Character Detail screen for captured prisoners
- Further fixes to crashes after lengthy play sessions

- Further improvements to performance by making sure GPU runs at maximum performance instead of sometimes using power-saving mode
- Further improvements to performance and crash issues by ensuring faster GPU is selected (when also have integrated video)

v1.0.1.4 – 10th March 2022
- Initial Release