

= Halo (megastructure) =

Halo rings are eponymous fictional megastructures and superweapons in the Halo science fiction franchise . They are referred to as " Installations " by their AI monitors , and are collectively referred to as " the Array " by the installations ' creators , the Forerunners . The series ' alien antagonists , the Covenant , refer to the structures as the " Sacred Rings " , believing them to form part of a greater religious prophecy known as " The Great Journey " . According to Halo 's fiction , the Forerunners built the rings to contain and study the Flood , an infectious alien parasite . The rings act together as a weapon of last resort ; when fired , the rings kill any sentient life capable of falling prey to the Flood , starving the parasite of its food . The installations are at the crux of the plot progression for the Halo series .

The Halos are massive ringworlds , which feature their own wildlife and weather . The constructs resemble Iain M. Banks ' Orbital concept in shape and design . The structure that Halo : Combat Evolved takes place on was initially to be a hollowed @-@ out planet , but was changed to its ring design later in development ; a staff member provided " Halo " as the name for both the ring and the video game after names such as Red Shift were suggested .

= = Overview = =

= = = Design and development = = =

The term " megastructure " refers to artificial structures where one of three dimensions is 100 kilometers (62 mi) or larger . The first use of a ring @-@ shaped megastructure in fiction was Larry Niven 's novel Ringworld (1970) . Niven described his design as an intermediate step between Dyson spheres and planets - a ring with a radius of more than 93 @,@ 000 @,@ 000 miles (150 @,@ 000 @,@ 000 km) and a width of 1 @,@ 000 @,@ 000 miles (1 @,@ 600 @,@ 000 km) ; these are dimensions far exceeding the ringworlds found in the Halo series , which feature radii of 5 @,@ 000 miles (8 @,@ 000 km) The Halos are closer in proportion to the Bishop Ring (habitat) , an actual proposed space habitat first explained by Forrest Bishop , though the proportions of the Halos do not exactly match up with Bishop 's idea . As seen in the games , Halo installations feature a metallic exterior , with the interior of the ring filled with an atmosphere , water , plant life , and animal life . What appear to be docking ports and windows dot the exterior surface , suggesting that a fraction of the ring structure itself is hollow and used for maintenance , living , and power generation .

Before the title for game developer Bungie 's next project was announced and development of the game that would become Halo was in its early stages , the megastructure that Halo : Combat Evolved took place on was a massive , hollowed @-@ out planet called " Solipsis " . The planet became a Dyson Sphere , and then a Dyson Ring . Some Bungie staffers felt the change to a ringworld was " ripping off Larry Niven " , according to Bungie artist Paul Russel . Bungie employee Frank O 'Connor wrote in a post on Bungie.net that " the specific accusation that we swiped the idea of a ring @-@ shaped planet wholesale is not accurate , " explaining that Bungie used a ringworld because " it 's cool and therefore the type of thing a Forerunner civilization would build . "

At the time , the game was known as Blam ! , but Bungie had always expected to replace the working title with something better (Blam ! was only used after studio co @-@ founder Jason Jones could not bring himself to tell his mother their next project was dubbed Monkey Nuts .) Titles such as The Crystal Palace , Hard Vacuum , Star Maker , Star Shield , and The Santa Machine were suggested . Russel suggested calling it Project : Halo because of the ring . Despite concerns that the title seemed too religious or lacked action , the name stuck . In turn , " Halo " became the ring 's name as well .

Combat Evolved 's Halo was intended to be populated with large animal life , collectively known as Fauna . The Fauna included " pseudo @-@ dinosaurs " and mammals , as well as a Chocobo @-@ like creature ? the " Blind Wolf " ? that players could ride . The animals were removed for technical

and conceptual reasons ; there were difficulties in getting herd and behavior action to work , and under pressure to complete the game 's more central aspects , the animals were dropped . Bungie also felt that the desolate ring heightened the sense of Halo 's mystery , and made the appearance of the parasitic Flood more terrifying and unexpected .

= = = Scientific analysis = = =

Physicist Kevin Grazier posited in a 2006 essay the composition and problems associated with a Halo installation . The complete Halos seen in Halo : Combat Evolved and Halo 2 orbit gas giants similar to Jupiter , though much larger ; the bodies exhibit characteristics of both a jovian planet and a small star . In each system , there are five points where a body of negligible mass would remain stationary to the two much larger bodies in the system , the gas giant and its moon . These areas , known as Lagrange points , are classified by stability ; while bodies at 60 ° angles to the gas giant would remain in the same location relative to the other objects in the system , the other three Lagrange points are meta @-@ stable , having the tendency to be unstable in one direction . As the Halos are located at point L1 , the installations must actively correct its orbit . The apparent gravity of the Halo installations is close to Earth normal . A Halo would have to spin with a tangential speed of 7 kilometers (4 @.@ 3 mi) per second to match Earth 's gravity , translating to 19 @.@ 25 rotations in a day .

Aside from its unstable position , Halos would have to contend with thousands of meteor and micrometeor impacts which would destabilize or destroy the ring ; there is no evidence in the games that the installations project an energy shield to prevent this occurrence . Because of the magnetic environment around the gas giant , a Halo would be exposed to high levels of radiation . Earth is protected from such radiation by charged particles created by the planet 's magnetic field . Grazier posits that huge conductive cables could run the circumference of a Halo ; when an electric current was run through these cables , a protective magnetic environment could be created to sustain life .

In the games , spectroscopic analysis of the ring 's composition proved " inconclusive " , implying that the Halos are constructed of an unknown material (unobtainium) . Were a Halo to be constructed using conventional materials a light steel alloy would be most feasible . Assuming that the ring structure is 50 % empty space , a 5000 km ring composed of steel alloy at an average density of 7 @.@ 7 grams (0 @.@ 27 oz) per 1 cubic centimeter (0 @.@ 061 cu in) would result in a total mass of 1.7x10¹⁷ kg . The amount of material required to build such a ring would be akin to the total material available in the asteroid belt .

= = Installations = =

= = = Installation 03 = = =

Installation 03 , also referred to as Gamma Halo , appears in Halo 4 . It is monitored by 049 Abjct Testament and is located in the Khaphrae system , orbiting a damaged planet . Whilst no gameplay takes place on the installation , an extremely dense asteroid field surrounding the installation is the site of the UNSC scientific research base Ivanoff . It is here that UNSC scientists are conducting experiments on the Forerunner artifact called the Composer , which has the ability to convert biological forms , specifically humans , into AIs . Once the game 's antagonist , the Didact , activates the device , the UNSC base is left uninhabited . In Halo : Escalation , a series of comics which follows many events after Halo 4 , establishes that 049 Abjct Testament has long disappeared from the ring , leading a monitor to arrive at the Installation , just to be ambushed by a still living Didact , using the Installation to use the Composer .

= = = Installation 04 = = =

Installation 04 , also referred to as Alpha Halo , appears in Halo : Combat Evolved . The majority of

gameplay takes place in areas on this installation , and its exploration drives the story . The ring was managed by an artificial intelligence known as 343 Guilty Spark , and is located in the Soell system , dominated by a gas giant known as Threshold . Halo orbits Threshold 's only satellite , an extremely large moon known as Basis . A group of humans aboard the ship Pillar of Autumn crash @-@ land on the ring after being pursued by the alien Covenant . The ring holds religious significance to the aliens , while the humans believe it is a weapon that could turn the tide of the war against the Covenant in their favor . In reality , the ring is home to a virulent parasite called the Flood , which is accidentally released by the Covenant and threaten to infest the galaxy . The human soldier Master Chief eventually detonates the Pillar of Autumn 's reactors in order to destabilize the ring and cause it to break up , preventing the spread of the Flood and the activation of the Halo network , which would kill all sentient life as a fail @-@ safe to starve the Flood . The Ark was alerted to its destruction and proceeded to create Installation 04B , which , too , was destroyed by Master Chief . During the game 's events , Guilty Spark alludes to a previous firing of the network , which Bungie 's director of cinematics Joseph Staten said occurred around 100 @,@ 000 years previous to the events of the game in the year 2552 .

= = = Installation 05 = = =

During the events of Halo 2 , the Covenant and humans discover a second ringworld , Installation 05 , or Delta Halo . It was monitored by 2401 Penitent Tangent , who completely ignored Flood warnings and was captured by their leader , the Gravemind . The Covenant leadership wants to activate the installation , believing it is the key to their salvation . At the same time , the Flood , led by an intelligence known as the Gravemind , lay siege to the Covenant 's city @-@ ship , High Charity . After 343 Guilty Spark informs Halo 's true purpose to the Arbiter , a Covenant holy warrior , of the danger that the Halos truly represent , a group of humans and Covenant Elites prevent the firing of the ring . The unexpected shutdown activates a fail @-@ safe protocol , priming the remaining Halo installations for remote activation from a location known as The Ark . In Halo 4 , it is revealed that the UNSC has created an oversight base on the Installation (or around it) , as they did with Installation 03 .

= = = The Ark = = =

The Ark , also referred to as Installation 00 , is located outside the Milky Way galaxy and serves as the construction and control station for the Halo weapon system . It does not share the ringworld geometry of the other installations . During Halo 3 , the Covenant discover a portal on Earth that leads to the Ark and are pursued by the humans and a breakaway faction of Covenant opposed to activating the rings . Gravemind , having hijacked High Charity , crash @-@ lands on the installation . The remote firing of the rings is halted by Master Chief and the Arbiter . In order to end the threat of the Flood , Master Chief decides to activate Installation 04B under construction in The Ark , the replacement for the Halo that he destroyed in Halo : Combat Evolved . Unknown to everyone but 343 Guilty Spark , a premature firing would destroy the installation ; the monitor attempted to defend ' his ' ring but was destroyed by Master Chief , who proceeded to fire the weapon . The firing tears apart the incomplete Halo and severely damages The Ark as Master Chief , Cortana , and the Arbiter try to escape through the Portal , which closes as they enter , leaving Master Chief and Cortana drifting in space while the Arbiter returns to Earth successfully , forming the setting of Halo 4 .

According to Greg Bear 's Forerunner Trilogy , a " Greater Ark " served as the location for the construction of larger 30 @,@ 000 km rings .