

## **Titan Makers**

Titan makers is a concept for communal housing built into a former Titan 1 Intercontinental Ballistic missile complex in Aurora Colorado. In simple terms the idea is to combine Housing with a maker space built around small businesses the residents own and run inside the complex. In a more generic form it is also a place to experiment with new ideas and share those ideas with the world. These experiments will be both small and large. In fact the entire complex is really an experiment as it's roughly the same size and a similar shape to a lot of proposed Mars colony bases and due to that it's an excellent location to experiment systems of government and food production systems for our eventual Mars habitation. With regard to food production systems, the complex offers a unique opportunity to build a state of the art and quite possibly the largest In the country vertical aquaponics system in one or more of the 150ft tall by 42ft diameter missile silos. This enormous aquaponics system will provide an opportunity to partner with Colorado State University which has a top 5 in the country aquaponics degree program offering a unique education opportunity while still meeting the dietary needs of the residents of Titan Makers. Finally because the complex is nearly 200,000 sq ft There's still room left over to run a really unique AirBNB providing extra income to the community and a much needed source of free advertising for the community and its mission.

### **Why a Titan 1 complex?**

Realistically the real answer is the shape. The complex is a bit like an ant nest in that there's multiple structures connected by tunnels. This provides an opportunity to keep work and living spaces separate for safety but still easily accessible no matter the weather. In some respect the answer is also cost as building a facility of this size even without the missile silos would cost several hundred million dollars, yet these facilities (there were 18 originally) have been known to sell for under 1 million making it extremely affordable on a per sqft basis compared to other existing or new construction options. In particular the facility I'm proposing Titan Makers try to acquire (724a) is currently owned by the City of Denver which has done largely nothing to the property since ownership was transferred to them in the 1980's except for spend money testing, and securing the site from trespassers. With a properly laid out plan emphasizing Titan Maker's commitment to community engagement and one or more partnerships with local schools and colleges I firmly believe the City of Denver will either sell or Long term lease the property to Titan Makers in an affordable way making the project feasible.

### **The Titan Maker's Mission**

To advance humanity technologically through public education, experimentation and inspiration as we aim to answer; What does a sustainable civilization look like, and how can we get there?

**Short version for logo's and such**  
Inspiration Through Innovation

**Ok but it's underground**

Because the complex is underground the cost of heating / cooling such a large facility is much more reasonable. Additionally because it is underground this leaves nearly the entire above ground 40 acres available for agriculture, walking paths, community spaces and trees. This also means residents will be fully protected in the event of extreme weather or a man made calamity.

### **But I don't want to live in a dark dungeon environment**

While the complex was originally built to withstand a nuclear missile strike that will not be its purpose going forward. To make the facility more home-like, modifications will be made to let in more light and provide more access to the above ground land. These changes will include cutting a 16ft hole in the top of the larger 140ft dome and installing a skylight, converting the multiple emergency egress tunnels into skylights and re-profiling the surface dirt to allow for doorways and stairwell access. Additionally above ground community rooms will be built to provide places to work and play while enjoying the grounds no matter the season. Finally efforts will be made to provide outside views with TV windows depicting the users preference of either live camera views or recorded videos of anything from mountains to beaches.

### **What will the living environment look like?**

This is honestly where things get interesting. My hope is that Titan Makers will look and operate something like StarTrek. This means food, basic healthcare, housing and work/research space will be provided. Visually it will be Modern minimalism with warm welcoming corridors and purpose built spaces for everyday tasks. It's my hope that this futuristic environment will inspire creativity and inventiveness in the residents and provide a link to the outside world to help inspire others.

### **Visual basics**

Upon entering one of the first things you will notice is the lack of Drywall and wood surfaces. The complex will still have wood furniture, art and other decoration but in general its absence will be notable. Walls, corridors and tunnels will be built with purpose in mind. Built-in lighting, sound deadening, handrails, benches and even planters will be prevalent and most wall panels and ceiling panels will be removable to access systems such as electrical, plumbing and communication lines hidden behind them. All of this will be designed with reuse and reconfiguration in mind and decorative, non functional details aside from art will be avoided to avoid clutter. Common spaces will be left as open as possible to remove the feeling of claustrophobia and to promote good community interaction. Where appropriate the use of planters for either crops or decorative plants / trees will be included in the design. Color palettes for the different areas will vary and in some cases will be color coded for ease of identification.

### **A descriptive tour**

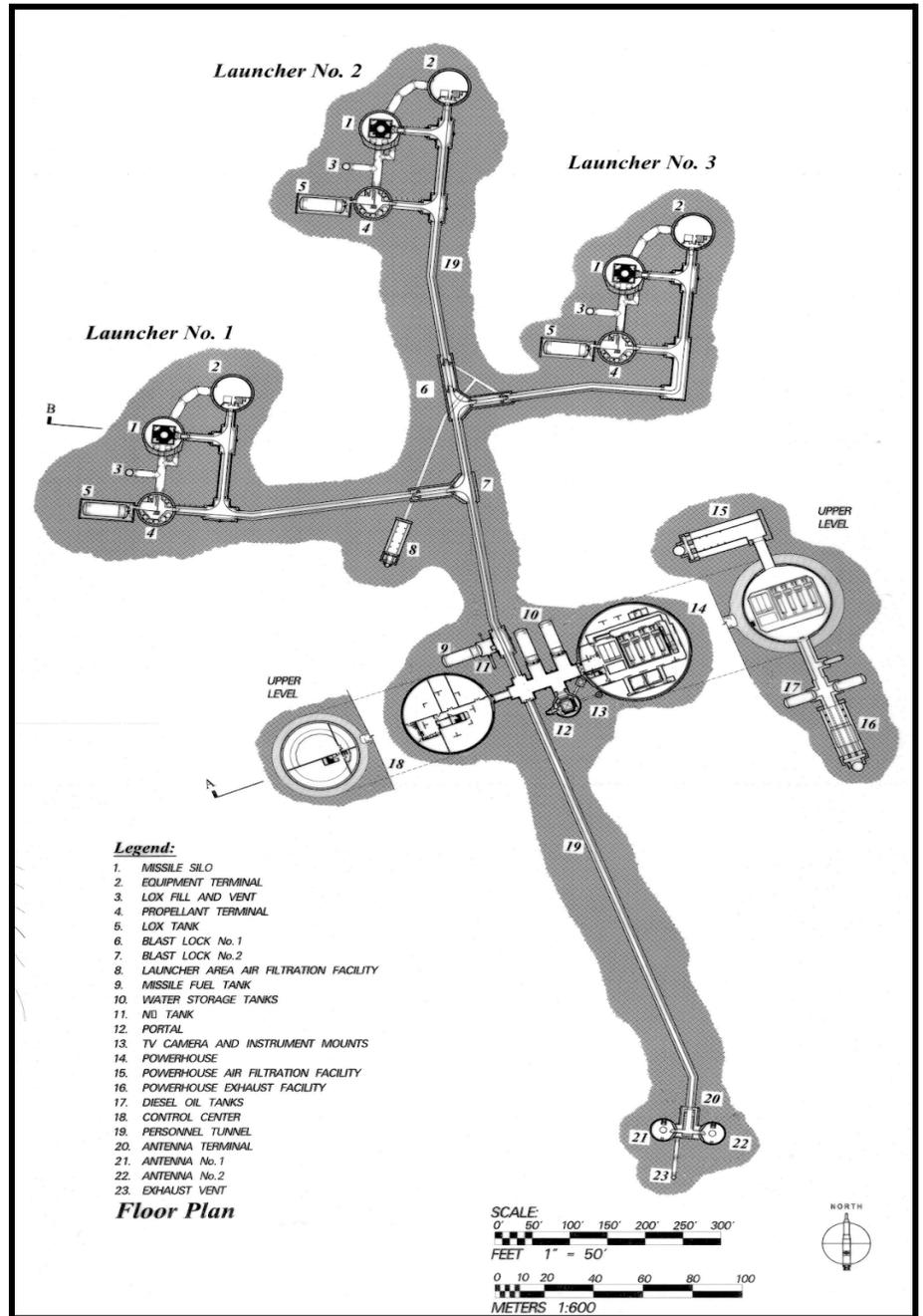
The size of this facility is a bit overwhelming so please keep in mind that the following descriptions are meant to give the reader a basic overview of the high level functions of each area. In most cases there will be overlaps in functions and facility uses between adjoining areas.

### **Antenna silos**

Starting at the bottom of the map we have two 27 ft diameter by 65 ft deep silos that were originally built to house antennas that would rise out of the ground to be used. These spaces will have two different uses.

The left silo (21) will sit under a welcome and history center built into a Quonset hut that explains what the site was, An ICBM site, and what it was turned into, Titan Makers. This building attached to the silo will have a glass elevator that descends into the complex and a circular staircase that depends around the elevator core which acts as an emergency egress as well as access to the aquaponics plants mounted to the perimeter of the silo. Once you reach the “ground floor” visitors will notice the old elevator shaft hole covered in glass and lit from underneath highlighting the fish living in the lower half of the silo.

The right silo (22) will sit under the store which is another Quonset hut and contain the required equipment to process and package the microgreens and vegetables grown on site for sale or distribution to local schools. Like the left silo this too will have an elevator and stairway but will be more utilitarian and set to the side instead of being centered. This right side will very likely be refrigerated for food storage with the lower levels used for dry good storage.



### Silo Junction

The junction between the two antenna silos (20) will serve multiple purposes besides a walkway. This will be the main connection point to the outside world so Utilities will have their connections placed here including but likely not limited to sewer/septic tie in, Grid Electricity, Off Grid electricity, Internet

and Cellular interconnect. This area will also be the first real visual expression of the Titan makers facility so it will also have large touch screens that provide directions, can connect you with TM staff and provide a place to issue and return guest lanyards which will have a tracking chip embedded. This area will also have a small seating area and example plantings guests can interact with. Anyone who does not live in Titan Makers or is an Airbnb guest will enter through this location so this isn't just for the occasional scheduled tour groups. This space will have 2 NFC/RF controlled security doors limiting access to the rest of the facility and to the Store silo (22) without approval. Note: The utilities will be past these doors, not before them.

### **300ft tunnel (19)**

This tunnel will be broken into roughly 50ft segments with a bench seating area marking delineating each segment. These seating areas will serve as a quiet place to speak privately with others, work or read in a quiet space. These breakpoints will also serve as access points for utilities behind the walls. Within the 50ft segments it's possible that these areas will be used as planting space for herbs and other spices commonly used in cooking by the residents.

### **Main tunnel junction (unmarked)**

Likely to be one of the most heavily trafficked areas of the complex, this area will feature navigational signage, touch screen panels to interact with the computer network as well as utility cabinets.

### **Entry portal (12)**

The Entry portal is going to remain the entry portal for the residents of the complex. Above ground will be a Quonset hut style building with elevators and a stairwell down into the complex. Adjacent to this building will be community member parking. Additionally this building will have some work space as well as office space for the Titan Makers community. The entry portal silo itself which currently contains a large utility elevator with a narrow stairwell wrapping around it will be removed and replaced with 2 resident elevators and one utility elevator with a modernized egress stairwell that's finished with paneling and decoration to the side. There will be additional uses for this space but in all probability it will be utilities.

### **Water Tanks (10)**

The two 33,000 gallon water tanks will most probably remain water tanks after refurbishment. The only major change will be replacing the maintenance covers with something transparent and the installation of UV sterilization lighting to help maintain the water quality. Additionally the walls in front of the tanks will house the water filtration system for ease of maintenance.

### **Missile fuel tank (9,11)**

The Final use for this area will depend on what is found when exploring. In some cases these Fuel tanks were filled with sand or concrete as part of the demilitarization of the facility. In other cases it was just emptied and flushed with water. If it wasn't filled with concrete there are 4 options, cut the end off the tank and use the roughly 40,000 gallon tank as a storage / mechanical room, compressed air storage, fire suppression water storage or it could be dug down to, removed and replaced with an

egress stairwell. If it is filled with concrete or sand it could be abandoned in place and hidden or it could be dug down to, removed and replaced with an egress stairwell.

#### **Power house (14)**

The 130' diameter by 54' foot tall Power house Dome will become the main housing area for the complex. Divided into 20 Pie shaped trapezoidal segments there will be an 8ft wide hallway around the perimeter of the dome with cabin entry doors to 18 roughly 350 sq ft cabins. These cabins will all feature bathrooms, kitchenettes, living rooms as well as one bedroom meant for double occupancy. These cabins will all be identical but in some cases will be reconfigurable to add a staircase to a second floor of the same size that will offer an additional bathroom and 2 bedrooms. In total, depending on configuration, this will provide housing for 54 to 72 people While leaving the center area of the first floor open for a 2,500 sq ft library and half of the second floor, roughly 5,100 sq ft (10,200 total) open for a galley and dining area while still maintaining access to the second floor corridors which lead to the former power house air filtration and exhaust tunnels. On top of all of this there will still be room for a third level of available space comprising of approximately 7,000 sq ft of useable space with a 16ft diameter skylight overhead that can be used for relaxation, exercise, yoga, and generally being an open space that's friendly to relaxing when the weather outside isn't nice.

#### **Powerhouse exhaust (16) and Diesel oil tanks (17)**

This area will still be the main air handling area for the facility but will also be used for laundry facilities and a computer network data center. The reason these two unrelated tasks will be in this same area is because they create heat. Using heat exchangers, this waste heat can be used to help heat the housing dome in the winter and it can be expelled in the summer as needed by simply reversing the air flow. The combined effect of this will be major energy savings, cooler, safer running computer equipment and conveniently located laundry facilities close to housing. If enough heat is generated this could also be piped to other areas of the facility for the same purpose through insulated pipes. Additionally the original day supply Diesel tank (5,000 gallon) if it can be safely repurposed would make for a great gray water storage tank for the used laundry water which can then be reused elsewhere for watering plants indoors or out. This area will also be home to an emergency egress point and a large water tank acting as a water tower to help maintain a consistent water pressure throughout the housing dome.

#### **Power house air filtration (15)**

This will be converted into a Kitchen and may or may not include a freezer depending on available space. The idea here is to keep the most probable source of a fire separated from the housing while still close enough to be functional and efficient.

#### **Control center (18)**

This 100' wide by 35'9" tall dome will largely stay in a similar configuration but with new purposes. The first floor will contain a medical facility and security offices. The second floor will be classrooms with the secondary purposes of a general meeting hall and events space.

#### **Blast lock 1 (T's off to Launcher area 1)**

Blast lock 1 is an L shaped concrete corridor primarily 12ft wide. The junction (T area) is a bit larger and will offer the opportunity to include a security / AirB&B host office and bathrooms in addition to the necessary utilities junctions space. In two areas of the ceiling there are 30" HVAC pipes meant to help ventilate the adjacent tunnels and silos.

### **Blast lock 2 (T's off to Launcher area 2 and 3)**

Blast lock two will house utility junctions and a Skylight which acts as an additional emergency egress / ventilation shaft. Functionally the junction is 12ft wide and rectangular in shape unlike most tunnels that are round in shape. This offers the opportunity to move the walkway off of center to accommodate other uses in the junction. In one area of the ceiling there is a 30" HVAC pipe meant to help ventilate the adjacent tunnels and silos.

### **Silo air handling (8)**

This area will continue to be HVAC for the silo area of the complex but it will also have a large water tank for fire suppression in the tunnels and areas below the tunnels.

### **Silo complexes**

Titan one sites were unique amongst missile silo sites in that they had 3 launch complexes instead of one. These complexes are composed of 5 primary components connected by tunnels which are then connected to the titan one complex by longer connecting tunnels.

- (1) **The silo** is a 40ft in diameter by 150ft deep cylinder. Each "floor" of the silo would make for 1256sq ft of space available before subtracting for an elevator shaft, stairwell and any required utilities space.
- (2) **Equipment terminal**. A 4 story cylinder 40ft diameter by 57ft tall. Each "floor" would make for 1256sq ft of space available before subtracting for an elevator shaft, stairwell and any required utilities space. This structure already has elevator shafts and floors dividing up the space.
- (3) **Ventilation LOX loading tunnel** - A 9ft 6in diameter shaft reaching the surface connected by tunnels to the propellant terminal and silo.
- (4) **Propellant terminal** - A 37.5ft diameter by 27ft tall cylinder. Each "floor" would make for 1104 sq ft of space available before subtracting for a stairwell and any required utilities space.
- (5) **LOX storage** (removed during decommissioning destroying the steel casing in the process making the space unusable without digging down to it and replacing the steel portion of the structure. The concrete floor and end walls are presumed to still be intact) If the space was rebuilt it would be 68ft long and 24ft high (presuming it isn't modified) and would offer 1632 sq ft per level. If the effort to dig down to this was made it would likely make more sense to rebuild this space to reach the surface and use the space as an access point to the complex in addition to whatever other uses may be needed.

(A) **Above ground** - I'm listing this as the space directly above the launch complexes will account for

most of the built structures above ground on the property.

The below is a first thoughts description on how the 3 silo sites could be used. Note the structures would be renamed in real life but for clarity I'm using the old names for the spaces in these descriptions.

#### **Launch complex 1 - Office space**

- (1) Silo - work / lab space, bathrooms on access tunnel level.
  - (2) Equipment terminal - work / lab space, Recording / podcast studio
  - (3) Vent shaft - Stairs to above ground (emergency egress), HVAC in/out
  - (4) Gym and Pool
  - (5) — —
- (A) Above ground - a round glass structure for work / relaxation space (indoor conditioned space with a view)

#### **Launch complex 2 - (vertical aquaponics) (energy storage)**

- (1) Silo - 2 levels of classroom / lab space, bathrooms on the main tunnel level and nearly 100ft of aquaponics below that.
  - (2) Equipment terminal - aquaponics storage / processing on two levels with recycling processing on the other two.
  - (3) Vent shaft - Stairs to above ground (emergency egress), HVAC in/out
  - (4) Propellant terminal - no current plans
  - (5) — —
- (A) Above ground - a round glass structure for work / classroom / relaxation space (indoor conditioned space with a view) and a aquaponics processing and shipping building which will also have a separate space for recycling / garbage processing

#### **Launch complex 3 (Air B&B)**

- (1) Silo - 3 top levels of Aquaponics space, an AirBnB "science lab" and 100+ ft of water storage for mixed use. Uses may include energy storage experiments, fish farming, a dive tank, airBnB ROV exploration.
  - (2) Equipment Terminal - the two lower levels will be an AirBnB rental (details explained elsewhere). The upper two levels have no current plans.
  - (3) Vent shaft - emergency egress stairs, HVAC in/out.
  - (4) Propellant terminal - AirBnB escape room challenge on the lower level. Upper level - no current plans
  - (5) — —
- (A) Above ground - AirBnB entry point.

#### **Above ground**

Above ground the property will be transformed from a barren military bombing range into a terraced garden and forest with lakes and walking paths breaking up the 40 acres. This "food forest" will become a natural oasis for wildlife while also serving the physical and mental needs of the Titan Makers residents. Efforts will be made to keep as much rain and snow melt water

on property as possible with regrading of the land to encourage water to slowly make its way to the lakes where it can be used for watering plants. This above ground space will also be used for reusing gray water and one area will be set aside for a large septic field if a local sewer connection is unfeasible. If the septic field is necessary that area will also be the one area of the property that has grass which can be used for sports, RC vehicles / planes or other similar open field activities.

Along the western edge of the property will be space set aside for solar and wind energy generation. This placement is purposeful as it's also along the main roadway which will make maintaining the equipment easier particularly in the winter months.

### **A commitment to sustainability**

Titan makers is an opportunity to try new ideas and it's going to do just that.

#### **Energy**

The entire facility will be powered by alternative energy including but not limited to Solar and Wind. Additionally energy storage ideas such as Battery storage, underwater Floating liquid piston accumulator using water under compression (FLASC), Gravity storage (water and weights), ShoreLine HydroElectric InFlow Dams, and other ideas we haven't yet discovered or invented.

#### **Materials**

Every effort will be taken to not only use recyclable materials but to use materials that can be recycled into the same products such as aluminum, steel, glass, and plastics like PVC, and HDPE. Materials such as FiberGlas will be avoided entirely as it is not recyclable and thus not sustainable.

#### **Food**

While the goal is to grow or source as much as possible on the Titan Makers property for those items that make more sense to purchase rather than grow ourselves such as grains, Local sources will be sought out.

#### **Inspiration through Innovation**

One of Titan Makers missions is to innovate and inspire others. As part of that mission Titan Makers will work on inventing new ways to recycle materials into useable products for the Titan Makers facility. In addition to material recycling there will also be an effort to develop and share technology that is used within the facility and all of this will be filmed, shared and open sourced to the world.

## **Potential revenue sources**

While the goals of Titan makers are to reduce dependency on outside revenue sources there will still be a need for income to support and grow the community. The following is an incomplete list of revenue source opportunities

- Resident rent
- Resident business profit sharing
- Corporate Donations
- Government contracts (mars research?)
- AirBnB
- Space rental for special events
- Youtube video ad sense
- Youtube product marketing (we test your product for money)
- Merchandise sales
- Product development (you bring us a problem, we solve it)
- Computer rebuilding and resale
- Data center
- Aquaponics college partnership
- Aquaponically grown vegetable sales
- Art and other goods made of recycled materials by residents
- Live video subscription service (think big brother minus the drama)
- Student tour groups (a few times a year)

### **Short term sources**

- Recycling the unneeded metals
- Allowing landscape waste to be dumped
  - This will help with reprofiling and building fertile soil
- Construction Tours
- Resident application fees