Company Name – Terratonics Limited

Registration Number – 624052

Address: Knock Killua, Clonmellon, Navan, Co Meath

Website – www.terratonics.ie

Telephone Number: +353 87 6175877

Principal Business – Provision of Concrete free foundation solutions for construction

Company Contact: Garvan Quish

Job Title: Commercial Director

Email address: garvan@terratonics.ie

Company Advisors – Connolly Accountants & Business Advisors Limited

Company Bank – Bank of Ireland

SBCI PRE Approval No PRE2000010458

HPSU Client of Enterprise Ireland

Executive Summary

TERRATONICS is disruptive technology that offers a robust pioneering concrete free foundation system to offsite manufacturers of Modern Methods of Construction systems (MMC's): such as, Timber Frame, Light Gauge Steel Frame and Structural Insulated Panels Manufacturers. Terratonics will allow these offsite manufacturers to replace expensive environmentally damaging concrete in foundations and subfloors. The company is targeting the global market. It has already signed a partnership agreement with Saint Gobain in France which world's largest building materials supplier. Herriot Watt University are using the Terratonics solution for their sustainable house of the future at the Dubai Expo which is now 2021. The company is also engaged in a UK Government project called Seismic. This is a project to standardise the building of modular schools of which 2,000 will be built per year.

A summary of the Key Benefits of the Terratonics Solution are:

Commercial

1. Reduces the overall foundation costs by up to 25%
2. Speed – the solution can be installed in a under a day – Conversely the entire curing period of concrete takes several days to weeks, each project will vary slightly due to differences in the weather, concrete mix and placement and finishing techniques.
3. Durability of the material we use is extremely tough and long lasting and when the main structure has passed operational life span the product can be reused or recycled.
4. Structural – The load is spread throughout site with Geotech engineering. It has a long-life span, can be recycled and is also suitable for seismic zones and flood plains. Our system eliminates the following common structural concerns
    a. Rising damp
    b. Radon gas entrapment
    c. Pyrite http://www.surveyorsjournal.ie/index.php/pyrite-guide/
    d. Mica http://www.consultingengineers.ie/2017/02/11/how-do-i-know-if-my-home-has-defective-concrete-blocks/
    e. Settlement foundation failure, ours can be adjusted if settlement occurs.
    f. Flood displacement (when a buildings base structure volume adds to increased flood levels)
5. Our system addresses the growing shortfall in trades especially wet trades and its installation can be achieved with using semi-skilled workers under supervision or by carpentry trades people.

Environmental

1. Pollution – Concrete omits 10% to 11% of global CO2 in additional to multiple vehicle deliveries to site. Production of the Terrapod omits small amounts of CO2 which is offset by the timber used in the rest of the base.
2. Water – No water required to manufacturer the Terrapods – In comparison concrete production consumes 3 billion M3/tonnes of water every year.
3. Sand is a necessary component of concrete however angular sand (quarried) is required in order to create a mechanical bond. Desert sand is windblown and spherical in structure and not suitable for concrete production. The world's supply of building sand is running out and is not replaceable. http://sand-wars.com/

The main component of the Terratonics solution is a Terrapod which is a structural pedestal beam carrier which transfers the building's associated loads to the engineered ground below. The Terrapod is made from an engineering polymer called Nyrim that is extremely tough and has both a high tensile and compression strength.

It is recognised globally that many countries have housing, pollution and water supply challenges and that solutions need to be found and implemented now, as time is quickly running out for fixing our planet. Global challenges will create new opportunities to improve these areas which are under pressure.

Housing

Supply is falling well short of demand – supply in the UK alone in 2020 is one million units behind demand. The construction labour force is declining. Highly skilled and experienced workers are retiring or have retrained into other professions. There is a huge shortfall in apprenticeship uptake due to lack of appetite to work in the construction sector owing to its vulnerability in economic downturn. The labour force is not sustainable, and a runaway crisis is unfolding before us.

Traditional onsite methods of construction are slow and arduous. They also predominantly use concrete which along with being very damaging to environment and time consuming brings a wide range of quality and working conditions issues.

Costs are rising month on month. Owning a house is difficult for councils never mind families.

Pollution

Cement is the one of the core materials in building a foundation for most builds and after water, concrete is the most used product in the world. *Concrete alone, produces 10 to 11% of the world's carbon dioxide emissions.* Imagine filling an area the size of Ireland 8 times over to a height of 2.5 metres based on ceiling height. This is how much CO2 gas concrete releases annually into the atmosphere. 5% is released from the chemical reaction process and 3% is released from energy from burning of fossil fuel. Cement Kilns operate at over 1000 C for 90 minutes per batch. (Robbie M. Andrew CICERO Centre for International Climate Research, Oslo 0349, Norway, https://doi.org/10.5194/essd-10-195-2018 5%).

Water Shortage

Along with releasing CO2 into the atmosphere, concrete production is responsible for using vast amounts of clean, fresh water. *Research indicates that during the next 35 years, 2,300–2,800 km^3 will be withdrawn by the concrete industry.* (https://www.nature.com/articles/s41893-017-0009-5) For example, annual concrete production uses a volume equivalent of 26 lakes the size of Lough Neagh. This is without cleaning the cement plant and equipment.

World environmental experts have agreed the construction industry has a big role to play in protecting the planet. The construction industry is one of the biggest polluters of the earth, mostly due to the use of concrete.

The Solution

Some areas within the construction sector have been quick to recognise the influence its sector is having on the climate. It has welcomed offsite construction also known as modern methods of construction (MMC's) to such effect that MMC's have become the first choice for many in the industry when it comes to building a fast-eco-friendly building. MMC's are manufactured off-site in factories in a high precision, quality controlled, safe working environment. Imagine if the cars we drove today were delivered bit by bit and built for you in a field! It is the same for buildings, but due to their size in most cases, they cannot be fully assembled offsite due to transportation issues, so they are usually manufactured in sections or modular units then delivered and assembled on site. This system greatly increases quality, repeatability, and safety along with productivity. However, MMC's are not perfect as they still rely on traditional foundations and floors made on site from concrete and steel. This is a bit like the first mass produced cars having steel wheels and no suspension (not very logical). That is where we come in. Terratonics has developed an eco-friendly rapid build foundation system, which can be easily installed by supervised semi-skilled workers. Terratonics will allow MMC's to fully detach from using slow traditional concrete foundations and become truly sustainable and green.

Financial Highlights (overview)

	R&D Certification	Trading			
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Unit Sales	**60**	**630**	**2,530**	**9,900**	**33,800**
Sales	**€21,800**	**€197.900**	**€816,000**	**€3,127,000**	**€10,524,000**
Cost of Sales	**€33,994**	**€223,836**	**€449,864**	**€1,331,004**	**€4,269,004**
Gross Profit	**-€12,194**	**-€25,936**	**€366,136**	**€1,795,996**	**€6,254,996**
Expenses	**€92,310**	**€580,854**	**€976,343**	**€1,532,704**	**€2,269,324**
Depreciation	**€640**	**€4,417**	**€12,820**	**€14,503**	**€14,570**
Net Profit before Tax	**-€105,144**	**-€607,182**	**-€188,348**	**€1,161,611**	**€5,242,040**
Corporate Tax	**€13,734**	**€75,849**	**-€76,276**	**-€32,911**	**-€498,209**
Profit After Tax	**-€91,410**	**-€535,358**	**-€546,751**	**€215,877**	**€3,472,893**
Dividends	**€0**	**€0**	**€0**	**€0**	**€2,000,000**
Retained Profit	**-€91,410**	**-€535,358**	**-€546,751**	**€215,877**	**€1,472,893**
Employment	**3**	**7**	**14**	**30**	**50**

Investment Expenditure is included in Appendix 1 attached. The company uses Xero **www.xero.com** for its day to day book-keeping which interfaces to Futrli **www.futrli.com** to produce detailed management accounts and forecasted cash flows, profit & loss and balance sheets.

Borrower Commitments

There are currently no borrowing commitments

Historic & Forecast Trading Position

The summary figures are outlined in the table above. The company is in a start-up phase which has been delayed by 6 months due to Covid. A comprehensive detailed forecast, cash flow and balance sheet are included in Appendix 1. The management accounting tool in place will produce detailed profit and loss variance analysis by month and send alerts to managements if targets are not achieved

Source and Status of new funding

It is envisaged that the company will raise €2,000,000 euro to finance the expansion plans of the company. This will be raised mainly through Investors and/or EIS from UK taxpayers as outlined below. It is expected to be raised in 3 tranches with an initial €300,000 raised in March 2021 and the balance in July 2021. The founding member of the company will hold the majority shareholding together with key members of staff. Advance approval from HMRC in the UK is in place. The company may also apply for matched funding from Enterprise Ireland

The company has registered a branch office in the UK (No FC037277) This will enable the company to seek out investments from UK taxpayers who can avail of tax relief under the Seed Enterprise Investment Scheme SEIS (max £150,000) and The Enterprise Investment Scheme (EIS) Maximum Investment £12m or £5m annually. The company has been cleared by HMRC and within 2 months expect to employ Swoop Funding to raise funds under these schemes. We have built into the forecast a raising round of €2,000,000.

Once funding is in place the company will arrange an overdraft facility with its bankers for €100,000. It is not envisaged this will be heavily utilised as it would be in place to allow for short term spikes.

Risks

Included in this report is a Swot analysis but there is no doubt that this can be a successful product but the impact of Covid could pose a detrimental impact on immediate funding. The company is early stages but has been already approved by Enterprise Ireland for matched funding and is a HPSU (High Potential Startup) company.

Staffing will be the biggest cost and it is not envisaged that major costs would be undertaken until funding is in place. There is currently no shortage of staff required to be involved in this project.

The concrete manufacturers will see this as a major challenge and could attempt to block any initiatives.

Premises

Currently there are no rented premises and apart from a minor investment in moulds there are no other assets.

Remuneration

There are currently no staff on the payroll. All work currently undertaken is provided pro-bono by Alan Ledwith and Garvan Quish.

Description of Business

TERRATONICS is a new system built on precision engineering and eco-friendly technology combined, to deliver advanced composite building materials, to create a rapid foundation system. Providing the construction industry, with a revolutionary solution in modern methods of construction which includes Timber Frame and Light Gauge Steel Frame amongst others.

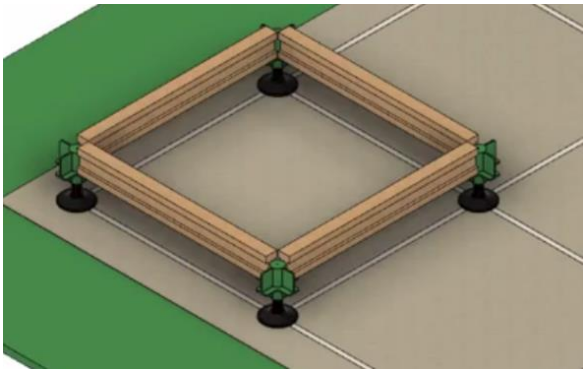
TERRATONICS technology has multiple disruptive impacts to traditional building foundations. Essentially this product is faster, stronger, greener and a more cost-effective solution. This system significantly reduces construction lead times and is up to 8 times faster than traditional cement foundations. It reduces CO2 emissions by over 90% in the buildings base by eliminating concrete requirements. As concrete is not required no water is needed saving 8 thousand litres of drinking quality water per average build.

TERRATONICS foundation system will allow construction on low level land, which would usually be considered unsuitable for construction without considerable civil engineering works in or near flood plains. Our foundation will reduce impact damage to building structures due to floods, diminish the lateral forces associated with earthquakes and reduce excavation and sub soil waste disposal by 100%.

TERRATONICS offers a new foundation system in building that will save 25% of the overall build cost, ensure completion in 80% less time than a traditional build, improve environmental impact by cleaner efficiencies as no water is required and most critical, TERRATONICS foundation system is not weather dependent.

TERRATONICS acknowledges that traditional construction methods are slow, and continuously challenged to meet supply demand. These market drivers have led to the development of Modern Methods of Construction (MMC's) and they include construction builds, such as;

- Timberframe
- Light gauge steel frame LGSF
- Structural insulated panel SIP
- X-LAM CLT, LOG
- Modular Build

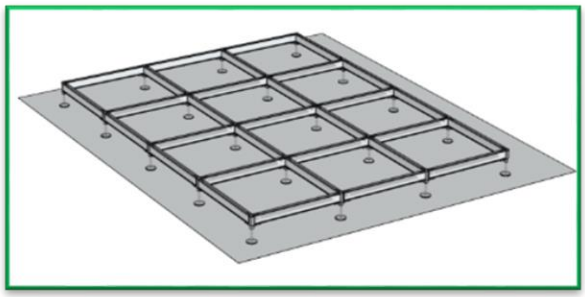


TERRATONICS products can provide a solution alongside MMC's that will satisfy the demands of the end user (customers), seeking green alternatives to traditional masonry. To date most improvements made have been focused from the ground floor up.

TERRATONICS have turned our attention to what lies beneath the floor and focused on the buildings foundations and ground floor (base).

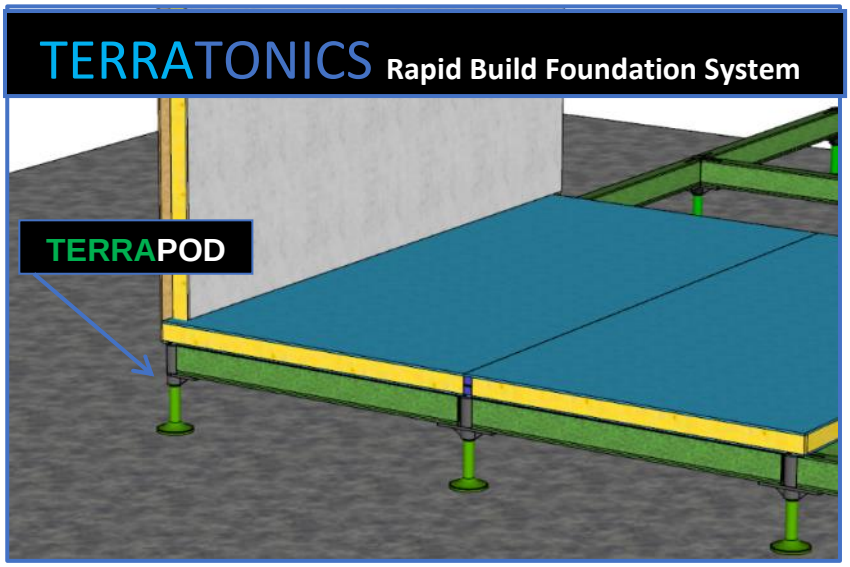
TERRATONICS will:

- Significantly reduce construction lead times by up to 30 days
- Reduce CO2 emissions by up to 90%
- Eliminate the need for water in the foundations or sub/ground floor
- Eliminate flooding by displacement
- Eliminate ground water flow obstructions
- Mitigate damage caused by seismic activity
- Huge reduction in excavations & sub soil waste



As MMC Manufacturers already produce beams and floor cassettes for the first floor of buildings we will offer them a system where they can use their products for the ground floor, which in turn will create a new revenue pipe line for each of these companies.

TERRATONICS will initially focus on manufacturing components which will be compatible and interchangeable with MMC's own structural beams and floor deck components. The technology consists of the Terrapod and the system which can be licenced out to MMC Manufacturers.



During the early research & development phase, we produced prototypes of various configurations and materials.

We identified an engineering polymer material called Nyrim, which we determined offers the best all round performance/balance in terms of ease of manufacture, cost, durability and strength. Nyrim brings the added benefit of exclusivity, being able to maintain a robust competitive edge and market dominance as only two manufacturers exist globally who can produce this product.

The first is FF Polymers Ireland who are very excited about **TERRATONICS** products and have agreed to be our manufacturing partner. The second is the Bruggemann Group both of which have a long-established business relationship. Bruggemann has been in production since 1868. Its headquarters are in Heilbronn, Germany. They also manage a distribution network from there. With about 220 employees and subsidiaries in the USA and in Hong Kong they serve customers worldwide. The Brüggemann Group achieved a sales volume of more than EUR 120 million (2016).

TERRATONICS will protect its technology IP with Trademarks and Patents. We have enlisted the services of Naoise Gordon & Associates Patent Attorneys.
International (PCT) Patent Application No. PCT/EP2019/081857 (PL Ref. P12983PC00)

Products & Services

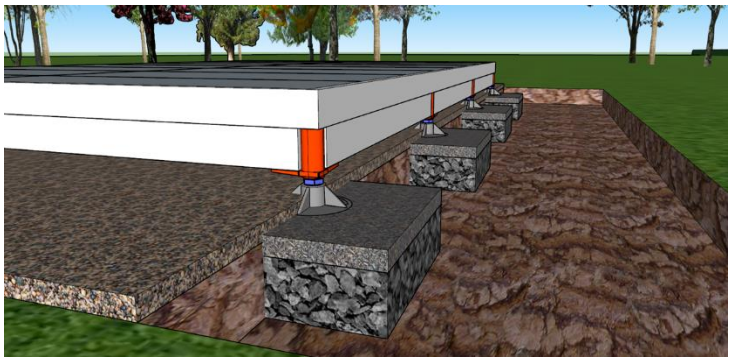
Our aim is to bring an exciting range of high-quality Irish designed, developed, and manufactured products to the global market. We intend to engage primarily in the following activities.

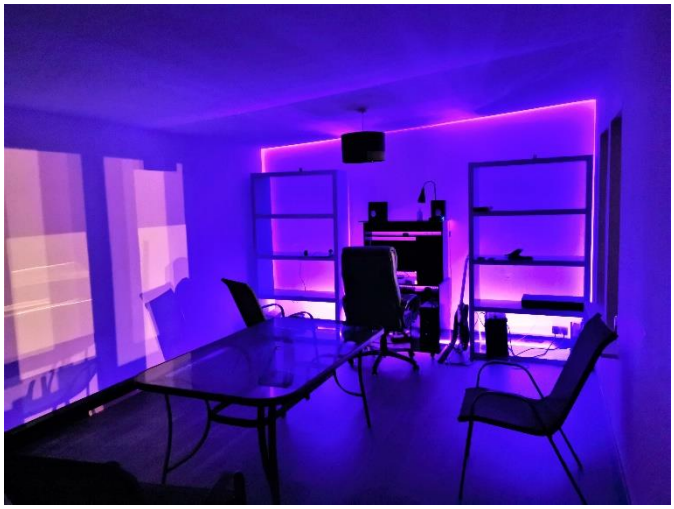
- Establish and grow the manufacturing aspect of our business
- TERRATONICS Sales Division
- Civil engineering and construction design services
- Civil engineering and construction installation services
- Continuous improvement through innovation, R&D and testing through to commercialisation

TERRATONICS is a specially designed structural system manufactured from a strong engineering polymer combined with reinforced composites along with other engineering materials.

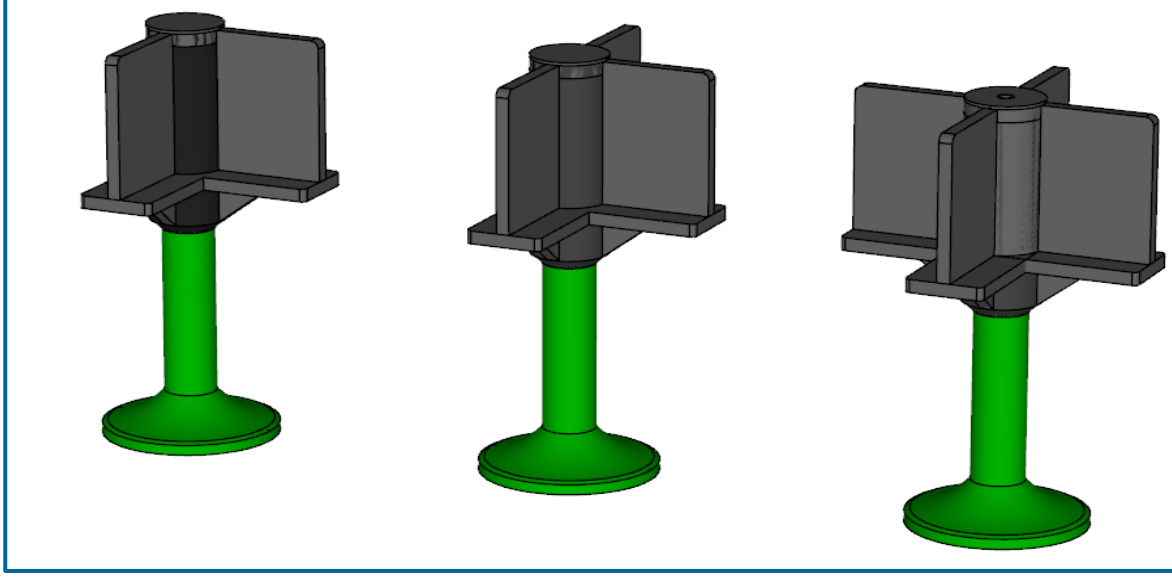
The system consists of 3 key components which are all proprietary technology

1. TERRAPOD
2. TERRABEAM
3. TERRADECK
4. TERRASPACE ROOMS Covid response Home Office/Workstation

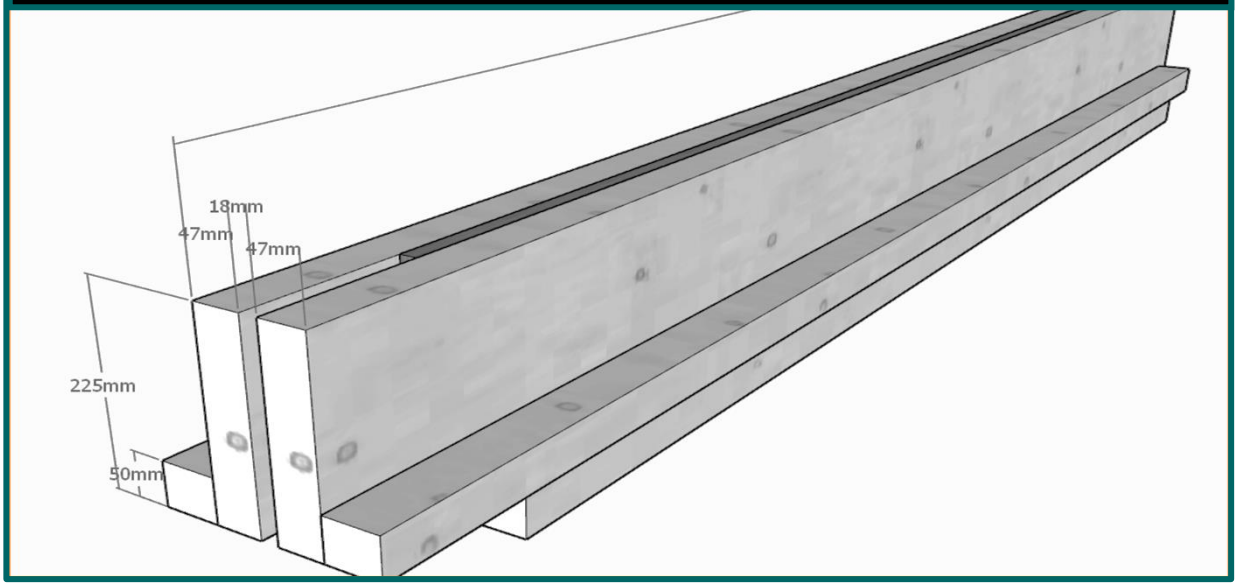




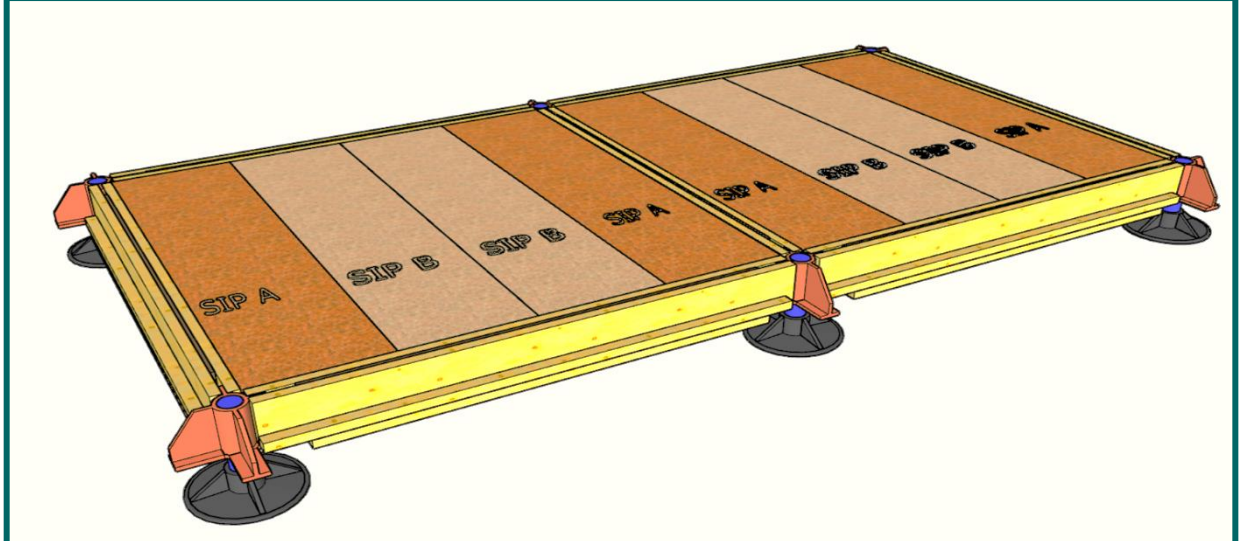
1. TERRAPOD Load Bearing Pedestal and Juncture



2. TERRABEAM Composite Laminated Beam



3. TERRADECK Insulated Floor Cassette System



Terrapods are linked to each other by structural beams (TERRABEAM) in a very rigid grid array; they provide an ideal level base from which to construct a building on. Terrapods come in three configurations to facilitate each associated junction type (Corner, Tee and Cross).

The **TERRABEAM** is a very strong and rigid eco-friendly structural Flitch beam, which is manufactured by laminating multiple layers of C24 Timber with OSB3 Smartply along with basalt fibre textile grids. This combination creates a far superior engineered timber beam, which has a high embedded tensile strength. The structural grid of the TERRAPOD & TERRABEAM provide an ideal supportive base for the TERRADECK

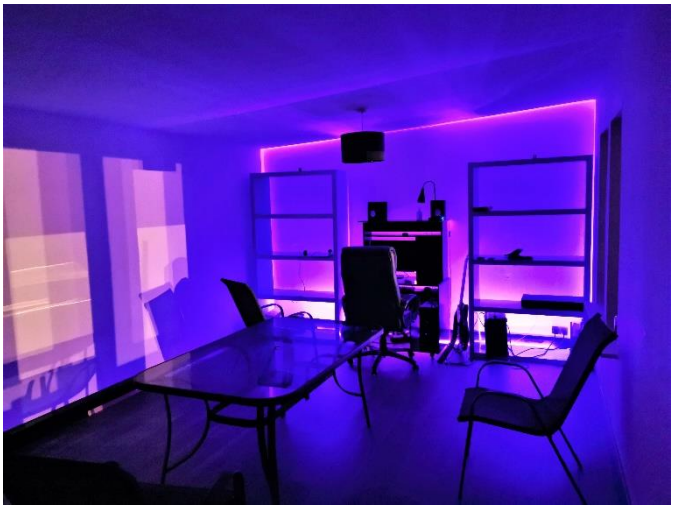
The **TERRADECK SIP Panel** is a specially designed flooring system that will complement the Terratonics system. It comprises of a structural ladder type frame that is strengthened by a top and underside layer of Smartply which encapsulates a highly insulated thermal barrier. The **TERRADECK** is attached to and supported by the **TERRABEAMS** and the **TERRAPODS** creating a fantastic base to erect any offsite manufactured building upon.

TERRASPACE ROOMS

In Response to the covid 19 pandemic we have created standalone home office workstations where people can work in a quite comfortable luxury workspace.

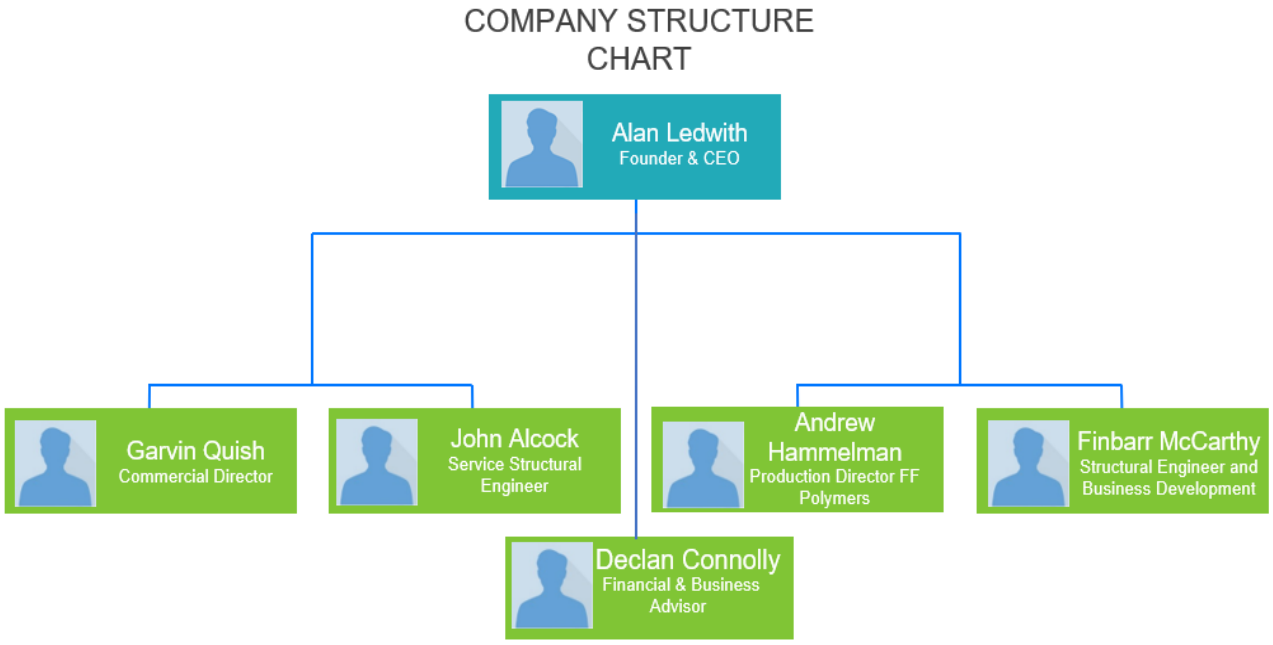
The Terraspace rooms will come in a number of configurations with optional extras our base 25m2 will retail at €30,000 with a 40% profit margin possible.

As staycation will become the holiday of choice we also will offer our unique designs to offer extra accommodation for hotel and castle holiday resorts in Ireland and the UK



The TERRASPACE Staycation SUNPOD

Management



Alan Ledwith: **Founder and CEO** has background in construction, engineering and timber frame manufacturing with over 30 years' experience in contracts, projects, business development and general management, coupled with trades in both electro/mechanical engineering and in carpentry. Alan's experience includes managing commercial, industrial, and residential construction projects from inception through to completion, as well as technical & commercial managerial experience incorporates the following sectors.

- Principal contracting
- Site acquisitions, development, and sales/marketing
- Scandinavian log building import & sales/marketing agent
- Timber framed buildings sales/marketing, design, manufacturing, and construction
- Precision & Prototyping engineering

Alan's organisational and motivational abilities have allowed him to manage multiple high value projects simultaneously and systematically, safely, and successfully, from inception through to completion. Throughout Alan's career, he developed the interpersonal and management skills required to communicate, influence, and manage staff, professionals, customers, and suppliers in a professional manner, as well as achieving company targets on time and within budget. Alan is also an ambitious creative inventor, eager to make an impact and bring about a real difference to improve the global building environment.

Garvan Quish: CCO Garvan's experience is selling complex core enterprise applications into industry verticals but he also enjoys taking disruptive products into established markets. An experienced business leader and strategist with an entrepreneurial drive and a pioneering approach to growth, new business development and profitability. An International Sales & Marketing Manager with expertise in construction products and systems, Software, SaaS, IOT Infrastructure, Banking, Automotive and Cloud sectors. Garvan has worked in both the start-up and large corporate environments achieving high value sales and driving business results.

Future Ticketing Sales Director SaaS, **Europcar Sales Director Ireland** Sales and Marketing Director **DeviceSmart IOT** Sales and Marketing Director, **Capital Eyes Int** Co-Founder Business Development Director

Benex Technologies Sales and Marketing Director Australia (Construction Products)

Kindle Banking Systems European Sales Director

Board of advisors

John Alcock – Senior Structural Engineer

With over 35 years' experience, John has been a Director of Alcock Lees Partnership Limited since 2007 and spent the previous 17 years as Partner.

Prior to this, John spent time with practices in London and Norwich giving him sound knowledge and experience on all aspects of civil and structural engineering projects.

John regularly handles design work on all range of developments including global multi-million-pound schemes in all construction materials. With vast experience and management skills John has been involved with areas of structural design on high-profile projects including the Olympic Village, Battersea Power Station and the Millennium Dome.

As well as working on standard structural projects John also works with specialist steel fabricators based across the UK on architecturally challenging and complicated steel structures. This work also involves elaborate staircases, sculptures, offshore design and temporary exhibition structures.

He is a highly regarded industry commentator and with extensive knowledge and expertise has been called upon to provide expert consultancy for industry bodies.

As a keen computer programmer John has also written all the structural design software that is used by the design team in-house.

Andrew Hammelman - Technical Advisor of FF Polymers

Has joined the team as a Non-Executive Director. Andrew has 30 years' experience in product design and manufacturing, mainly specialising on engineering polymers and composites, supplying a wide range of products to various sectors. Andrew is currently assisting us in designing and developing prototypes and production models.

Established in 1999, FF Polymers Ltd. specializes in moulding Nyrim components (a thermoplastic material) for worldwide customers in a wide range of industries, including the oil & gas industry, construction, and transportation industry. Of the products FF Polymers manufacture, 99% are exported. Andrew is a mechanical engineer and has 30 years' experience in manufacturing engineering polymer products. With an experienced workforce they manufacture high quality Nyrim components for niche market applications.

Declan Connolly FCCA – Finance Director & Business Advisory

Declan the majority shareholder in Connolly Accountants & Business Advisors Limited in both the UK & Ireland. Started the practice in 2003 and now has 47 staff at 3 locations in the UK and one in Ireland.

As a practice we lead in the automation of accounting, book-keeping, and financial forecasting in the cloud. We were able to seamlessly transfer all staff to home working overnight because of Covid-19.

Contact with all staff is maintained by utilising all features of Microsoft Teams. Our clients are benefiting significantly from this expertise.

I operate at Board level with several clients, providing management report, forecasting and business advice. We provide an advance level of forecasting to clients.

Finbarr McCarthy – Structural Engineer

Finbarr is an Civil and Structural engineer with demonstrated experience within the renewable and controlled environment sectors of the wider construction industry. Skilled in Heat Network Simulation, Heating and Cooling System Design and Integration, Project Financing, Product Management, Contract Management and Water Resource Management. He has previously worked with Kingspan, Meath & Louth County Councils, O'Connor-Sutton & Cronin and the PM Group as resident Engineer and Project Coordinator.

Pricing Model

Terratonics has three business models for the TERRAPODS TERRABEAMS & TERRADECK

1. **Direct**. The list price of the standard Terrapod is €400. Terratonics will have an automated unit/price calculator on its website that matches Terrapod units with building design. Production costs are currently €150 per unit and we see this reducing to €120 per unit at scale – 20,000 units.
2. **Wholesale** – Distributors, Construction companies, Councils and Government. We are currently involved with the UK government schools building project call Seismic - https://www.constructionmanagermagazine.com/modular-primary-school-consortium-launched. Pricing her will be €300 per unit
3. **Licensing** – In partnership with Timberframe and Prefabricated Manufacturers who will build in Terratonics as part of their solution. We foresee licensing on a 1,000 unit basis at €250 per unit. We have signed cooperation agreements with Saint Gobain, Cemex, Rothoblaas and Herriot Watt.

For the TERRASPACE Covid response ROOMS

We plan to sell directly to the end users.

Our basic high-end model sells for €30000 plus Vat this includes a profit margin of 40%

Competition

We believe that the following attributes put us in a unique position to compete in the building marketplace:

1. Unique products, materials, and manufacturing process
2. Exceptional manufacturing partners and suppliers
3. Protecting patent and design registration trademark
4. A disruptive green technology aimed at the construction market with the added benefit of solving multiple issue in both the construction and the environmental sectors
5. First to market thus gaining 'first mover advantage'
6. Large global market

Profile of Competitors

- In situ concrete foundations systems commonly used by specialist groundwork installation teams
  - Strip: masonry block rising walls, floor slab
  - Raft: rising block, floor slab
  - Pile and ring beam, floor slab

- Pre-Cast foundation system
  - Pile & ring beam, precast floor deck, poured finish floor

There are various methods of piling commonly used

- Steel piles hydraulic driven
- Steel piles hammer driven
- Concrete piles hydraulic driven
- Concrete piles hammer driven
  In situ auger bored with poured concrete plies
  At present the construction sector predominantly uses all the above methods for foundations.
  One recent disruptive technology is steel screw pile foundation systems. This technology has already seen significant growth in the US for example

Steel plies screw driven

The approximate total annual revenue for U.S. manufacturers comes in at $280 million. Applying the 5% accuracy variable, the revenue range is $266 - $294 million. These numbers do not include products manufactured in Canada and sold into the U.S. market **Helical Pile World 2015**

R&D

Part of Terratonics growth strategy is to have a very engaged and adaptive R&D department to continually monitor and access our sector of sustainable construction solutions.

We will set aside resources towards our annual R&D budget to develop innovative solutions under our 5 pillars attributes: Sustainable, Durable, Affordable, Fast and Ergonomic.

Current areas of R&D focus

1. Terrapod fixing system
    a. We are currently working with **Rothoblaas** on developing a complementary ridged connection system using their epoxy resin system combined with our Terrapods fig 1
    b. We are also working with Rothoblaas on creating a full range of timber connector solutions for our systems for Timber Frame, SIP and CLT buildings
2. We are developing our own composite timber beams using timber and basalt fibers ***TERRA*BEAM.**
3. We are also working on our own design insulated floor deck systems ***TERRA*DECK**
4. Terratonics is developing new Terrapods for Light Gauge Steel modular building (figure 3) and Beam connectors for modular buildings (figure 4)
5. Due to more people working from home we have also started designing garden office/recreational space units. These will be delivered flat packed to the site and will be using our foundation system example fig 2
6. We are also investigating plaster free internal and external wall cladding systems which will address the issues associated with wet trades
7. We also hope to Develop dynamic thermal cavity SIP once we are established and profitable.

Figure 1.

Figure 2.

Figure 3.

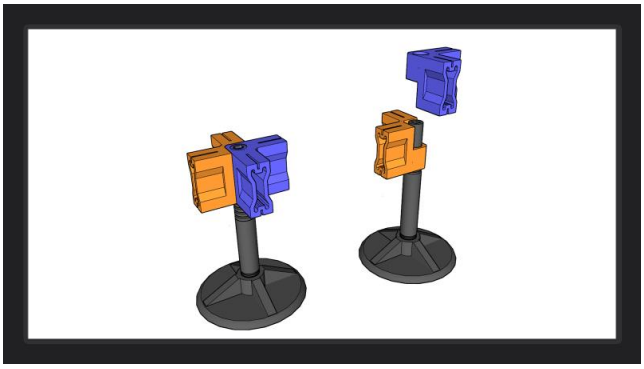
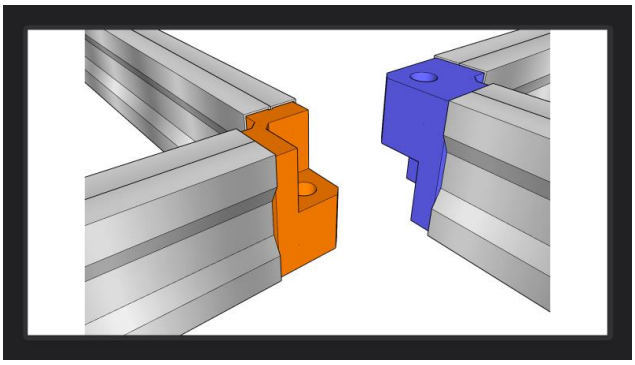
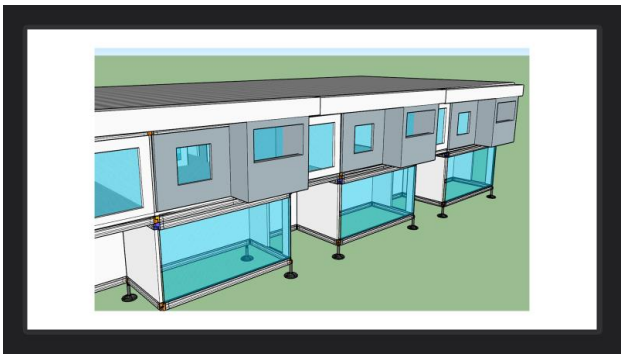


Figure 4.





COVID-19 Impact on Business.

As a startup we have experienced both delays in terms of raising investment and the commercial development of the business.

Several projects that we were working on have stalled until the crisis is over. They include:

- Partnering with the McEvoy Group as part of a consortium called “Seismic”. This is a project developed by the UK Government to create a standard modular build of all new UK schools – 2,000 per year. Terratonincs to provide the foundation system.
- Partnering agreement signed with Saint Gobain in France (the world’s largest building materials company). They want to run a POC (proof of concept) with a subsidiary – Scotframe.
- Partner with Rothoblaas – construction component manufacturer – they want to include the Terrapods into a single foundation solution with their components to provide to their global Client base.
- Heriot Watt university are using the Terrapods as their sustainable house of the future that was to be exhibited at Dubai 2020 – now postponed to 2021 – huge global exposure for us.

To move forward the company in undergoing EU Certification testing with the BRE Group in the UK and we are working with the well know Structural Engineer John Alcock of Alcock Lees on this. This certification while not compulsory will add credibility to the company. This should be awarded in April 2021

The company is looking to raise EIS investor funding in the UK March 2021

The company has applied for EIT Climate Kic COVID Venture support funding as we were a Climate Kic finalist company – current.

The COVID crisis will result in more employees working from home permanently and therefore demand will be strong for home offices. Terratonics has started designing garden office/recreational space units. These will be delivered flat packed to the site and will be based on our foundation system.

SWOT Analysis

Strengths	Weaknesses
• Key Manufacturing Partners • with monopoly on technology and materials in their field • Access to the resources required • for the design and development • of new products. • Ability to envisage, design and create exciting beneficial new products • 30 years of construction experience • 20 years' experience in business • Management experience • Business systems and process • knowledge • Manufacturing experience • Once testing is completed, we are Production Ready • Commercial, manufacturing and marketing support from key industry leaders	• New product into the construction sector – lack of motivation to change from traditional builds • Partnership development in B2B • Unknown product • No brand awareness
Opportunities	**Threats**
• The construction sector is ready for Greentech solutions, which will help save the environment, time and money. • Current growth globally and need for lower cost new houses • Access to emerging markets • Our products provide solutions address shortcomings of existing products. • The emphasis of our products is • to reduce environmental impact through inventive engineering	• Cash-flow management in early • stage development • Securing early stage investment funding • Similar product entering the market • Timing of market entry • Potential market failure of products developed • Resistance by concrete suppliers and manufactures

Sales Strategy

TERRATONIC'S sales team will be fully supported in terms of design and technical backup team, training, marketing & advertising, social media presence, supply chain and sales support.

Our sales team will prospect mainly through the following market segments

- Housing associations
- County and City Councils
- Housing Developers
- Specification selling through architects and structural engineers
- Offsite Housing Manufactures
- Building contractors
- Self-build customers

Pricing

The price point will be determined by the production cost which will in turn, be determined by the complexity of the design, the standard and quantity of materials used and the production volume.

Following initial research, a target consumer price point will be determined based on existing solutions from which the target production price can be deduced and fed into the product design brief. Individual product pricing will be determined through fine tuning production and operational costs and maximising profit margin. It is intended that price points will be proportionally balanced at the mid to higher end of the category scale, which will be in keeping with the premium brand positioning strategy.

Advertising & Promotion

The company will target business-to-business (B2B) market through all available channels. Maximising digital and networking opportunities. We expect to sell the majority of our products to MMC's manufacturers and the remainder to the construction market via Architects and Engineers through specification sales.

We will look at the most effective advertising campaigns to promote the brand through key market initiatives promoting TERRANTONICS brand marketing. Seeking cross promotional advertising activities with partners and businesses to product promote and support customer engagement.

Our website will be educational to support promotion of products, to educate customers and for online purchasing and advise where needed. It will contain video, slides and comparison data.

We intend to showcase products via media at exhibitions and conferences, identifying key social media to target relevant audiences. Hardcopy quality brochures will also be produced to promote and sell products.

Research & Development

We have already established links with other Irish companies (FF Polymers and Mafic) and NUI Galway. We will carry out a full testing campaign on the Terrapod and the foundation system through a commercial test centre of excellence to get full approval for our system firstly in the EU followed by other regions in our target markets.

Patents, Copyrights, Branding

It is a stated objective of the enterprise that all intellectual property rights arising from any product development work will be protected either by patent in the case of technological innovation or design registration, and that these rights will be vested in the company as assets. International (PCT) Patent Application No. PCT/EP2019/081857 (PL Ref. P12983PC00)

Strategy & Implementation

Even though a TERRATONICS base is strong enough to support masonry building it would be defeating the purpose, which is creating buildings which have little or no air polluting concrete.

TERRATONIC'S is ideal for MMC's and eco-friendly types of construction methods so MMC's manufacturers will be a major focus of our marketing and sales drives.

It is anticipated that all new and related products will be launched under the TERRATONICS brand name, so it will be vital from the outset to ensure that all marketing and promotional activities will be consistent in brand message. key messages: innovative, time saving, green, durable, value for money.

We want to create a core brand identity which is perceived as innovative, clever, practical and premium. It will appeal to MMCs which are already a pro adaptive market, who embrace new concepts and technical innovations that offer a green alternative and well defined sustainability.

Competition

We believe that the following attributes put us in a unique position to compete in the building marketplace:

7. Unique products, materials and manufacturing process
8. Exceptional manufacturing partners and suppliers
9. Protecting patent and design registration trademark
10. A disruptive green technology aimed at the construction market with the added benefit of solving multiple issue in both the construction and the environmental sectors
11. First to market thus gaining 'first mover advantage'
12. Large global market

Profile of Competitors

- Insitu concrete foundations systems commonly used by specialist ground work installation teams
    - Strip: masonry block rising walls, floor slab
    - Raft: rising block, floor slab
    - Pile and ring beam, floor slab
- Pre Cast foundation system
    - Pile & ring beam, precast floor deck, poured finish floor

There are various methods of piling commonly used

- Steel piles hydraulic driven
- Steel piles hammer driven
- Concrete piles hydraulic driven
- Concrete piles hammer driven

Insitu auger bored with poured concrete plies

At present the construction sector predominantly uses all of the above methods for foundations.

One recent disruptive technology is steel screw pile foundation systems. This technology has already seen significant growth in the US for example

Steel plies screw driven

The approximate total annual revenue for U.S. manufacturers comes in at $280 million. Applying the 5% accuracy variable, the revenue range is $266 - $294 million. These numbers do not include products manufactured in Canada and sold into the U.S. market **Helical Pile World 2015**

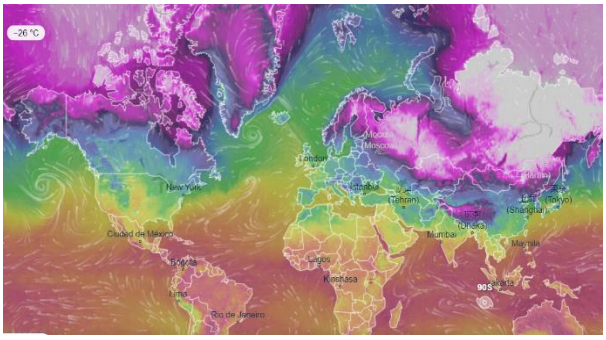
Competitive Advantage

TERRATONICS is a fantastic alternative building base compared to using a concrete or pile foundation system on which to construct buildings.

Even though a TERRATONICS base is strong enough to support masonry building, it would be defeating the purpose which is to create a strong and rapid foundation system for MMC's type of buildings. Its main competitive advantages are

- Easy to install
    - Safer to work with

    - No specialised plant requirements
    - Low weight
    - Clean with no waste
    - Lower associated labour cost
    - Ease of training
- 7 times faster than conventional systems
- Not weather dependant
- 10 times stronger
- Durable offer of long-life guarantee
- Frees up more development land, lowering site costs
- Eliminates concrete which in turn reduces CO2 emissions by over 90%
- Reduces water displacement during floods by 99%
- Absorbs and diminishes the lateral forces associated with earthquakes
- Reduces excavations and sub soil waste disposal by 100%
- Exclusive technology which is not easy to replicate
- Terrapods bearing capacity load is distributed over the entire site with the use of a geo grid system, this creates a very mechanical stable base. Whereas other foundation methods bearing capacity is focused directly below their contact area. For example see diagrams below.



- Lower cost & better value for money
- Green solution 90% less CO2
- Quicker build times (home buyer can move in quicker saving on rent €000's)
- Reduced number of stages
- No drying time
- Not weather dependent
- Less insurance issues with greater mitigation of these risks
    - floods,
    - subsidence
    - Pyrite concerns alleviated
    - Safer in earthquakes
- Healthier has no Radon issues ventilated air gap underneath building lets gas escape
- Additional storage space
- No rising damp issues
- Energy saving with better thermal insulation with air gap under house, conduction area reduced by 99%

Appendix 1

Investment Expenditure

Year	2021	2022	2023
Production Cost (outsourced)	€20,000	€100,000	€450,000
Salaries	€370,000	€740,000	€1,200,000
R&D	€50,000	€200,000	€300,000
Offices and Expenses	€40,000	€80,000	€120,000
Marketing/Tradeshows/Travel	€10,000	€100,000	€300,000
Patents/Trademarks	€20,000	€80,000	€20,000
Certification Fees - International	€30,000	€40,000	€40,000
Total	**€540,000**	**€1,340,000**	**€2,410,000**

Option to Build Production Line – cost €1.5m second on same sight €.5m