



MANAGEMENT OF NPD ASSESSMENT B

CREATE THE DESIGN BRIEF

Abstract

Demonstrate a systematic understanding of the key elements that contribute to the successful gathering of market knowledge for the new product development.

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Document Control

Issue No.	Detail of change	Name	Date
1	Initial Release	Steve Cope	30/01/23

Scope

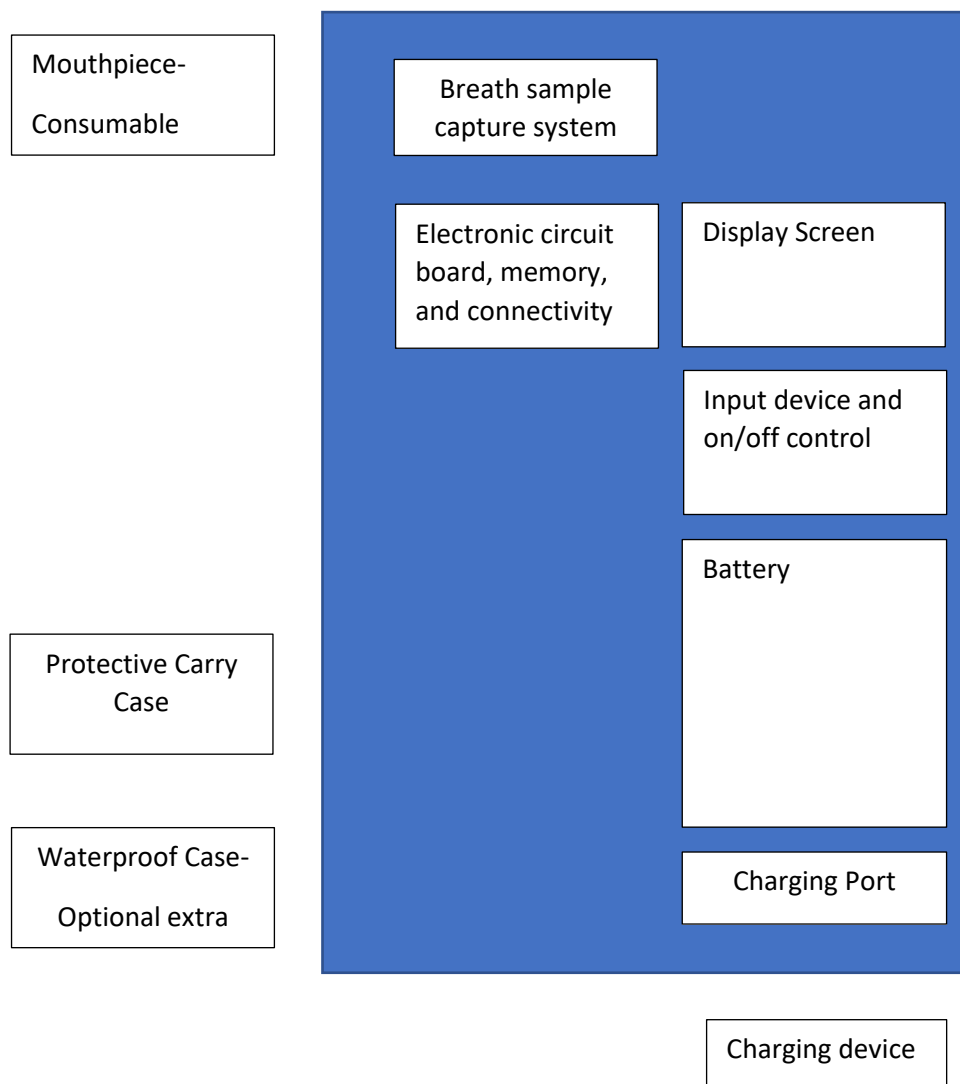
A new product development project through a Knowledge Transfer Partnership with a local university, the Company identified an opportunity to extend the chemical alcohol detector system which is at the heart of their breathalyser products to cover the detection of other organic materials, including those generated in the breath as a result of various virus infections. The new system has been trialled successfully in the laboratory and the necessary patent applications have been registered.

Considering the current Coronavirus pandemic, the Company see great potential in developing a product that can meet both clinical and personal requirements for such virus detection and are therefore anxious to bring the new product to market as soon as possible. The company has already gained certification for the new Virus Detect from the various medical device regulatory agencies.

However, the nature of the changes to the detector system is such that the existing breathalyser products cannot be employed as the basis for a new 'Virus Detect' product. Consequently, a completely new product design is required.

Product Architecture

Based on the prototype product testing, the product has already gained certification for the new Virus Detect from the various medical device regulatory agencies. There is a wealth of knowledge in producing existing products, but this product design brief is going to explore the possibility of new ideas to produce the new product. Hopefully some of these techniques can be employed to reduce the cost of the existing products.



Aesthetics

○ **Shape**

- Compact handheld device
- Flowing lines with comfortable grip
- Clearly visible ambidextrous controls
- Touch screen operation
- An area for unique product ID Number

○ **Colour**

- Use pre-approved pigments for colouring medical devices not to invalidate testing.
- Use saturated colours to indicate grips and controls.
- Cooler colours on the colour wheel promote a calming impression.
- Lower pigment or even clear materials on disposable components

○ **Branding**

- Prominently display product name and company logo
- Incorporate into the colour scheme.
- The shape and colour should be recognisable as the brand.

○ **Style**

- Streamline and modern.
- Robust, hard wearing, and reliable
- Clinical and hygienic feel
- Not too complicated to use.

○ **Texture**

- Hygienic and easy to clean.
- Easy to hold and operate while using PPE.

Links / Dependencies www.team-consulting.com/insights/the-role-of-colour-in-medical-devices-a-designers-perspective

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Repair and Maintenance

○ **Maintainability**

- Embed maintenance into the design of the product.
- Safe replacement of its components
- Quick and easy replacement of its components
- Keep product maintenance costs low.
- Short out of service times
- 1st line maintenance at the point of use
- 2nd line maintenance at a service station
- 3rd line maintenance is undertaken by us the manufacturer.

○ **Preventative maintenance**

- Plan services according to components life cycle
- Change components where degradation endangers components elsewhere in the product.
- The product must have a calibration information i.e. date last calibrated and time until next calibration

○ **Repair**

- Fast Time to Repair (TTR, also known as 'turn-around time')
- Modular construction so each module can be replaced at the point of use.
- Use mechanical fixing not adhesives.
- Minimal use of specialist tool and equipment.

Links / Dependencies <https://www.design1st.com>

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prototyping

- **Digital**

- Several concept designs of the product
- Virtual renderings of the product to assess the [Aesthetics](#)
- CAD models with different material properties
- Virtual mock-up of the electronics
- Virtual mock-up of the user interface

- **Physical**

- 3D Printed rapid prototype to gauge [ergonomics](#), [size](#) and [weight](#) of the product.
- 1off fully functioning Prototype allows user [testing](#)
- Sample pieces for [testing](#)
- Short batch production run.

- **User-centric validation sessions**

- Gain first hand feedback.
- Evaluate how the user interacts with the product.
- Fault find in the documentation and software.

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Branding

- **Define brand ideas.**
 - What is our product offering?
 - What problem does it solve?
 - Who does it solve this problem for?
 - What makes your solution unique?
- **Specify our market.**
 - Who are we selling to?
 - What problems do they have?
 - What unique attributes separate our customers from other people?
- **State the brand promise.**
 - What can expect from our brand.
 - List all the reasons why customers choose our product.
 - Which of the reasons make the most sense.
 - Build our brand promise around these assets.
- **Brainstorm our value proposition canvas.**
 - What way is our product different from the competition?
 - Does our product use less resources to achieve the results?
 - What features does it have?
 - What rational drivers of purchasing does it have?
 - What emotional drivers of purchasing does it have?
 - What hidden needs does it fulfil?
- **State brand values**
 - What beliefs does our brand stand for?
 - Good brand values help stay true to our vision.
 - Boost employee performance.
 - Create a memorable brand.
 - Connect better with our customers.
 - Inspire brand loyalty.

Links / Dependencies <https://www.ziflow.com/blog/brand-brief>

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Manufacturing Facilities

- **Size**
 - There shall be enough room to test and Assemble the Components
 - There shall be enough room to store goods in and dispatch.
 - There should be a maintenance facility.
 - There should be a Repair facility and recycling plant.
 - The facility should have the possibility for expansion/ scale up.
- **Location**
 - Should there be Single or multiple locations?
 - Should the site be in the UK or multinational?
 - Must carry out all necessary site surveys and gain planning permission.
 - The Location shall have Access to a skilled labour force.
 - The location shall have availability of machinery and tooling.
- **Layout**
 - Must house all the different departments.
 - Should consider the follow of the production line.
 - Take advantage of natural light and temperatures.
 - Must comply with acoustic standards.
 - Warehouse to hold goods in goods out.
 - Should be able to adapt and evolve to the company's needs.
- **Environment**
 - The ground conditions must be suitable for the facilities, machinery, and transport.
 - The site must not be within and area at risk from natural disasters.
 - The site must not encroach on areas of natural beauty or scientific interest.
 - Aim to make as little impact as possible and have the smallest footprint.
 - If possible, use an existing building or brown field site.
- **Logistics**
 - The manufacturing facility must have good transport links.
 - The manufacturing facility must have access to materials.

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Social & Cultural

○ **Internal Culture**

- Attract like-minded employees, and customers.
- Foster passion and motivation among employees.
- Convert employees into passionate brand ambassadors.
- Create a brand that's authentic.

○ **The Brand Culture**

- Accommodate the maximum number of people, irrespective of their gender, race, or age.
- Aim to reduce planned obsolescence with upgradable modular design, reversing the 'throw away culture'
- Use sustainable and recyclable materials.
- Ethically source materials and subcontract components
- Evaluate the unforeseen side effects the product might have on certain groups.
- Assess the legal implications the product might have in different areas.

○ **Language**

- The product must operate in all the major languages.
- The operating instructions must be written in the major languages.
- Should it be voice activated for visually impaired people.
- Should there be audio instructions.
- Should the instruction manual be visual (e.g. LEGO instructions) for countries with low literacy rates

Links / Dependencies. [THE SOCIAL AND CULTURAL RESPONSIBILITIES OF DESIGNERS | Chiaroscuro Magazine](#)

[Aesthetics](#)

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Company Constraints

- **Time**
 - The time it takes to get the product to market.
 - The time it takes to produce each product to keep up with demand.
 - The time the product is viable to get a return on the investment.
- **Finances**
 - Budget
 - Cash Flow
 - Investment
 - Credit Rating
 - Debt
- **Labour force**
 - The company must have the right number of people with the appropriate skills to achieve its business objectives.
- **Leadership and Direction.**
 - Directors and managers of a business should have the right skills and abilities e.g. to create well-structured plans and to motivate and lead other members of the organisation.
- **Availability of supplies**
 - We must ensure we have the quantities required.
 - We must negotiate the correct pricing.
 - We must demand the correct quality.
 - They must be available at the right times.

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Market Constraints

- **Market**

- The size of the market we are going into, might be different in different geographical areas.
- The nature of demand in that market, do the users buy a product once and never have to buy one again.
- The competitiveness of the market
- Profitability of the market, what price the market can tolerate.
- Economies of scale can we sell enough product to drive down prices or increase profitability.
- Increase sales through brand loyalty and reliability.
- Increase our customer base by building a good reputation.
- Dominate the market by being first to market with our innovative product.
- Increased market share will give higher bargaining power with suppliers and customers.
- Legal rulings the push us out of the market
- Political decisions that mean we are not allowed to trade in this sector.

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Quality

○ **Quality Objectives**

- Lay out the quality objectives as early as possible in the design process.
- Evaluate what factors will have the biggest impact on the product, e.g. Defects, Performance, Reliability, Timeliness.
- Determine the quality requirements of the product in relation to internal specifications and complying with external standards or regulations.

○ **Critical to quality**

- Identify the areas that will have the biggest impact on the quality of the product.
- Battery will last a consistent amount of time?
- The product will not spread diseases?
- There will be less than 1% reject rate?

○ **Quality Culture**

- The principal that human error is not acceptable it is designed out of the process
- The expectation that the designs/product are critically reviewed.
- The view that all problems can be prevented and not fixed after the event.
- Address the root cause of a problem not just the symptoms.

○ **Defensive Design**

- We must assume that if there's a "wrong way" to use the product the end user will find it.
- Use advanced quality planning and FMEA to design failures and human error out of the product.
- Adopt Poka-yoke techniques to prevent assembly/maintenance errors.

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Competition

- **Direct**

- Have access to resources that allow you to sell a superior product?
- Are you positioned at a better location?
- Do you have the best talents working in the industry?
- Protect our IP, technology, and designs.
- Keep a written overview of our top 3 competitors.

- **Secondary**

- A competitor that is not in the same market but can influence our market.
e.g., a company that has a vaccine to eliminate Covid 19 so there is no requirement for testing.

- **Indirect**

- Competitors that solve the same problem in a different way.
- In the same sector but have different products
- In a different sector but solves the same problem

- **Future**

- Competitors that could produce a new superior product that will replace ours
- Research who's most likely to put us out of business, know what new developments we need to adopt to adjust, and overcome them.

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Materials

All materials selected must conform to the latest medical Standards, be responsibly sourced and fully recyclable

Material	Advantage	Component
Polycarbonate	Easy to sanitize. This material provides good UV protection and doesn't deform from exposure to high temperatures or steam	Outer Casing
Polypropylene	This plastic is resistant to impact and corrosion. It's more durable than other plastics	Outer Casing
Acrylonitrile butadiene styrene (ABS)	durable and tough, providing a clean aesthetic appearance that is perfect for medical environments.	Handle Grip
Polyethylene	Polyethylene is a plastic that healthcare providers can sterilize. It's also a material that doesn't degrade over time	Handle Grip
Polyvinyl chloride	A wide range of single-use items use PVC because it's inexpensive and because throwing away these items is safer than sanitizing	Mouth piece
Recycled/ECF Bleached White Fiber Paper	Produced from 100% recycled wood pulp, elemental chlorine-free (ECF) bleached white fibre	Mouth Piece

Links / Dependencies [Medical Plastic | Learn About Plastics Used in Medical Devices and Procedures - A&C Plastics](#)
([acplasticsinc.com](#))

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Reliability

○ **Analyse and Assess**

- Estimate the product's reliability early in the design phase.
- Use estimates based on engineering documentation and expert opinion.
- Physics of Failure analysis, simulation models,
- Prior warranty and test data from similar products
- Compare different design concepts.

○ **Quantify and Improve**

- Design of Experiments provides a methodology to create organized test plans to identify important variables.
- Life Data Analysis techniques to statistically estimate the reliability of the product and calculate various reliability-related metrics.
- Highly Accelerated Tests to reveal possible failure modes and complement the physics of failure knowledge about the product.
- Reliability Block Diagrams for testing an entire system by relying on the information and probabilistic models developed on the components or software.
- Fault Tree Analysis to identify defects and risks and the combination of events that lead to them.
- Reliability Growth tracks the effectiveness of each design change and can be used to decide if a reliability goal has been met and whether, and how much, additional testing is required.

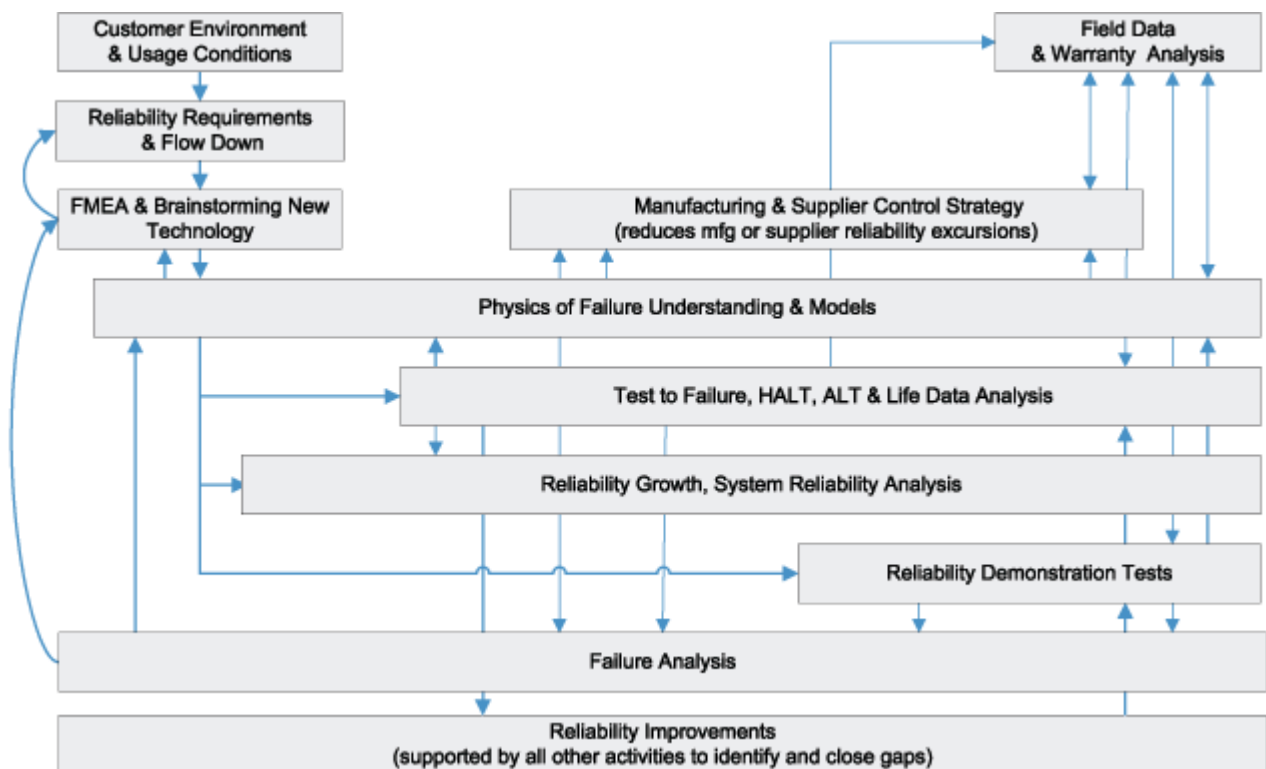
○ **Validate**

- Demonstration Test to ensure that the product is ready for high volume production.
- Statistical methods should be used to develop a test plan that will demonstrate the desired goal with the least expenditure of resources.

○ **Monitor and Control**

- Process FMEAs to examine the ways the reliability and quality of the product can be jeopardised by the manufacturing and assembly processes.

- Control Plans should be used to describe the actions that are required at each phase of the process to assure that all process outputs will be in a state of control.
- Factory Audits are necessary to ensure that manufacturing activities are being implemented according to requirements.
- Supplier Audits are necessary to ensure that manufacturing activities are being implemented according to requirements.



Links / Dependencies [Design for Reliability: Overview of the Process and Applicable Techniques - ReliaSoft](#)

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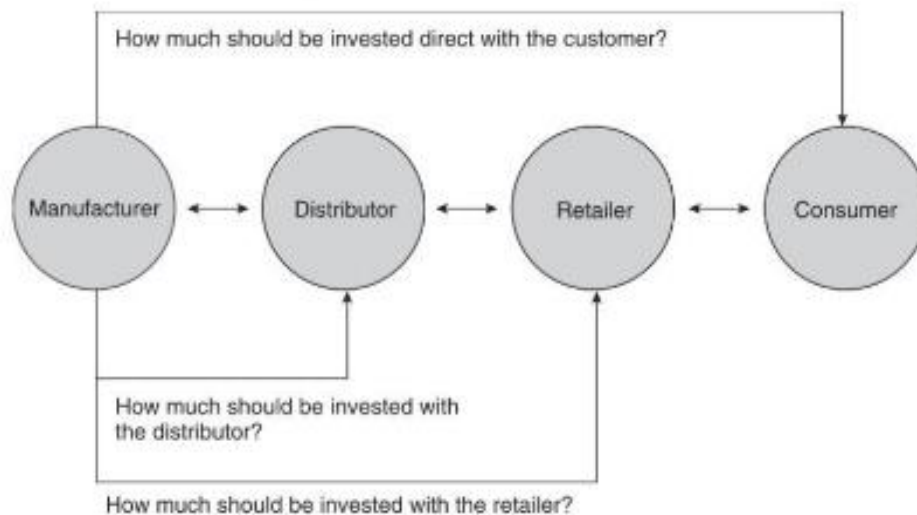
[Competition](#)

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Customer

- **Who is the customer?**

- Distributor
- Retailer
- Consumer



- **Definition of the relevant market**

- The breadth of the service line
- The types of customers
- The geographic scope
- The area of 'value added' in which the product operates.

- **Criteria for market segment viability**

- The segment must be measurable in size.
- The segment must be capable of generating sufficient profit to merit separate marketing attention.
- The segment must be reachable within resource budgets.
- The segment must be durable over time.

Links / Dependencies [Payne. \(2005\). Handbook of CRM](#)

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Packaging

○ **Design**

- The packaging design brief needs to be as straightforward as possible, follow a simple structure and remain realistic.
- The packaging design brief must provide details around the product, the challenges it faces and what the design needs to accomplish, and the practical deliverables expected.
- The packaging design brief should go over the basics that lay the foundations for the packaging design.
- The packaging must introduce the brand and product. This should pitch the whole brand.

Clearly lay out the brand name, story, initiatives, and plan how to communicate and establish the brand narrative through the product.

- Provide a clear indication of what appeal the brand holds for customers and establish what sets the product apart from the rest.
- Give the packaging designers a clear vision of what aspects to showcase and highlight through the packaging.

○ **Material**

- Compare what materials manufacturers offer for the product and ensure it fits in with the product, company, and brand ethos.
- Achieving a high-quality feel doesn't always mean have to mean opting for the highest-quality materials.
- It's important to compare material options as it plays into the quality of your final product packaging.
- Packaging specialists can offer guidance on material optimization.
- When picking the right material for the packaging, Logistics, product specifications, product protection, storage environment, recyclability and customer journey should be considered.

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Safety

○ **Safety Critical Features of the Design**

- For components and construction of the product, if our testing suggests a value we should over specify on safety critical areas
- Multiple identical components should be used simultaneously, any one of which would be capable of supporting normal product function.
- A back-up system is held in reserve and should come into operation only when the main system fails.
- A Fail-safe design assumes an inherent risk of failure for which the cost of any of the above three strategies would be prohibitively high. The product or system is designed to drop into a safe condition in the event of partial or total failure.

C2 Design for Reliability - V2 (design1st.com)

○ **Human Factor Engineering**

- Defining the device's intended users
- Defining the environments in which the product is used.
- Defining the primary and frequent functions users will perform with the system.
- Defining the tasks that users will perform with the device.
- Identifying users' needs
- Developing a list of user interface design requirements to meet users' needs.
- Defining the primary and frequent functions users will perform with the system.
- Identifying use-related risks and their associated likelihoods and severities
- Identifying risk control measures (i.e., mitigations to the risks), which might include design features and learning aids.
- Conducting formative evaluations to assess the device's safety and usability.

Links / Dependencies [Safety and Human Factors Engineering in Medical Device Design - Medical Design Briefs](#)

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Circular Economy

○ **DESIGN OUT WASTE AND POLLUTION**

- The product design must minimise the negative impacts of production.
- the release of greenhouse gases should be kept as low as possible.
- hazardous substances should be eliminated.
- Pollution to land, air and water must be avoided.
- Use Eco packaging and only the minimum amount needed.
- Design a way in which the incoming packaging could be recycled into new packaging or products.
- Produce the components using renewable energy.

○ **KEEP PRODUCTS AND MATERIALS IN USE**

- Eradicate the use of virgin materials.
- Produce components out of recycled materials.
- Defective modules are sent back to the manufacturer, tested and only the defective components are replaced.
- Establish a maintenance philosophy in terms of 'repair versus disposal' of the product and components.
- Work with supply chains to ensure our brand values are met.
- Define end-of-life services to deal with the products.
- Consumable item made from suppliers packaging.

Links / Dependencies [The Circular Economy In Detail \(ellenmacarthurfoundation.org\)](https://ellenmacarthurfoundation.org/)

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Size

○ **Size of the Product**

- The product must be a portable handheld device that can be used by a wide range of adults.
- Handle Length should be over 100mm to keep contact outside of palm.
- Handle Diameter should be between 30-50mm for greater stability.
- The screen should be between 40-50mm for visibility.
- The mouthpiece should be between 10-16mm diameter and 30mm-50mm long.
- Over all dimensions should be under 180mm x 110mm x 80mm for logistics

○ **Size of the packaging**

- The size of the packaging must not exceed 240x160x119.5mm for logistics.

Links / Dependencies <https://www.cadcrowd.com/blog/11-tips-for-good-ergonomic-product-design-and-development/>

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Documentation

○ **Competitive Analysis Documents**

- Name of the Competitor
- USP of the Competitor's product
- Precise number of sales
- Duration of the competitor's presence in the market
- Specifics and specialty of competitors
- Cost of product

○ **Product Strategy and Vision Documents**

- Paint a picture of the future of the product that we are striving to create.
- It can be in the form of a storyboard, a narrative or a prototype which aims to inspire teams, investors, and partners towards the product.
- Product strategy is the sequence of products that are meant to be created until the final product is achieved.

○ **Specs and Product Requirement Documents**

- Research problem statements
- success metrics,
- Minimum Viable features list,
- Engineering implementation details
- Identify any potential problems.
- Visualise the time scale required for project development processes.
- Rough budget outline
- Voice of the customer

○ **KPIs, success metrics**

- Objective & Key Result to establish the results of the ongoing product development process.
- KPI (Key Performance Indicator) is a type of performance measurement of the ongoing development process's success.

- **Roadmaps Documents**

- A roadmap is a way to let the team know the importance of the product.
- A product manager should develop a product life cycle explaining what needs to be done when.
- A roadmap is a compiled document of all the projects developed in order to successfully create the product.
- User stories and customer journey maps

- **Designs and Prototypes Documents**

- Elimination of the risk of misinterpretation
- Expeditious iterations
- Justification of the concepts early in the process
- Increased quality of technical feedback
- Customer-Facing guide and user manual documents.
- Release Notes and Product Scope
- Internal Guides and FAQs

Links / Dependencies

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Performance

- **Number of samples**
 - The finished product should be capable of taking a sample every minute.
- **Accuracy of samples**
 - The product should not give any false negatives.
 - The product should give no more than 2% false positives.
- **Software**
 - The software must be able to analyse the number of samples required.
 - It must be intuitive and responsive.
 - Be able to store over 10,000 test results.
 - The product should be able to find its own location using GPS
 - The product should be able to connect to Bluetooth and WIFI
 - The product should connect to an app or database.
- **Hardware**
 - The construction of the product must withstand the environment it is used in.
 - The materials must hold up to the assigned life cycle of the product.
- **Battery**
 - A full charge must perform over 8000 samples.
 - While in an active state the battery must last at least 24 hours
 - While in a standby state the battery must last at least 48 hours
 - While in a dormant state the battery must last 7days

Links / Dependencies [Alcolmeter 900 – Lion Laboratories](#)

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Shelf Life and Storage

- **Device storage**

- Storage recommendation for most electronic components is in an ambient temperature of around 15° and low humidity and minimum static charge.

- **Chemical storage**

- All chemicals must be stored in a safe, secure location.
- Shelves should be level, stable, and secured to the wall or another stable
- Store chemicals away from direct sunlight, sources of heat, and egress pathways
- Hazardous chemicals must be stored below eye level.
- Do not store chemicals on the floor, window ledges, or balconies.

- **Batteries**

- An expired battery has self-discharged over 20 percent.
- As soon as a battery is manufactured, it immediately begins to lose its charge.
- Discharge occurs at variable rates based on storage environment, temperature.
- Storage recommendation for most batteries is in an ambient temperature of around 15° and low humidity. batteries should never be permitted to freeze, and refrigeration is neither required nor recommended by battery manufacturers.
- Whether being transported or stored, batteries should never come into contact with metallic items or other batteries.
- batteries should be individually wrapped in plastic.

Links / Dependencies [Battery storage, shelf life, self-discharge, and expiration \(microbattery.com\)](#)

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Environment

○ **Facilities**

- The ground conditions must be suitable for the facilities, machinery, and transport.
- The site must not be within an area of foreseen natural disasters.
- The site must not encroach on areas of natural beauty or scientific interest.
- Aim to make as little impact as possible and have the smallest footprint.
- If possible, use an existing building or brown field site.

○ **Product**

- The product must operate in a range between -10 and 40 C
- The product must be splash proof but doesn't need to be used underwater.
- If there is a need for greater waterproofing, then an additional protective cover could be purchased.

○ **Touchscreen**

- When using a display outside it will need a display with a high bright backlight
- Consider optically bonding the touchscreen to the display, this will help compensate for the sunlight reflecting off the glass surface of the display.
- The low and high temperatures experienced in outdoor conditions and the potential need to review the use of wider operating a storage temperature displays.
- The user must be able to use the touchscreen in conditions where the user needs to wear gloves (PPE)
- Still be used where there could be water droplets on the screen.

Links / Dependencies [Battery storage, shelf life, self-discharge, and expiration \(microbattery.com\)](#)

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Politics

- **Financial**

- Sustain ability grants.
- Covid support grants
- PPE/Medical equipment contracts

- **Non-financial**

- Do the products and systems we create have political implications?
- Do politics within the design process affect the products we develop?
- Does our political system (government, laws, regulation, etc.) affect design and technology?

- **Incentives**

- Designers must acknowledge their role and accountability in what they are producing and have a responsibility to design with wider public values in mind.
- The design must put diversity and inclusion at the heart of all products produced.

- **Regulations**

- Brexit
- MRHA

Links / Dependencies [Design in 2019 – how will politics impact the design industry? - Design Week](#)

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Shipping

- **Size of standard euro pallet**

- 1200mmx800mmx1195mm
- 6x6x10 = 360 units per euro pallet

- **Size of a 40ft container**

- 48 pallets x 360 products = 17280 per 40ft container
- 500,000 products = 29 containers in the 1st year
- 5,000,000 products = 290 containers per annum in the second year

- **Eco-Friendly shipping**

- Distribute the inventory to minimise both order fulfilment time and carbon footprint.
- Plan orders and distribution to take advantage of land and sea shipping.
- Consolidate small orders into bulk packages.

Links / Dependencies

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Ergonomics

Physical Ergonomics

- **Defining the use case**
 - Observe and document the step-by-step use of the prototype.
 - Analyse the use of the product
 - Define the measurable forces that apply to the product.
- **Defining the user**
 - Define the demographics of the target user.
 - Gather the anthropometric data.
 - Incorporate Disabilities
- **Defining Product Architecture**
 - Select the type of Grip.
 - Evaluate the amount of contouring.
 - Consider the weight and balance of the product.
 - Chose the correct Material hardness for comfort and durability.
 - Consider how the duration of use would affect the design.
 - Validate the design pre-production, testing the virtual data and prototypes.
- **Triggers**
 - Frequent movements of the index finger while operating the trigger of power tools (such as a power drill) poses a considerable risk for both "trigger finger" and "trigger thumb" (tendonitis in the index finger and/or thumb). A longer trigger which allows the use of two or three fingers to activate them reduces discomfort and minimizes the risk for injury.

Psychological Ergonomics

- **Decision-making**
 - Study mental processes like memory, cognition, reasoning, emotion, and perception.
 - Look at the user interacts with a product on a mental level.
 - What effect it has on the users' thought processes, and feelings.
- **Cultural and religious differences**
 - Incorporate the most common languages.
 - Story Board instruction manuals for illiterate users

Links / Dependencies <https://www.avient.com>

[11 Tips for Good Ergonomic Product Design and](#)

[Development | Cad Crowd](#)

[Branding](#)

[Size](#)

[Testing](#)

[Aesthetic](#)

[Material](#)

Processes

- **Electronics**
 - contained in a single circuit board.
 - fully assembled and tested form.
 - Sourced from China or Malaysia.
- **Mechanical Manufacturing**
 - The mechanical element of the detector will be fabricated from injection moulded parts.
 - Specifying and sourcing the external casing will depend upon the final form of the product as generated by the product design company.
- **Assembly**
 - Decide whether to source this element as a fully assembled unit or to source the mouldings separately and assemble the unit in house.
- **Testing**
 - Quality control and testing would be carried out in house.
- **Marketing**
 - Should the new product be marketed in the same way as existing products.
- **Distribution**
 - Should the new product be distributed in the same way as existing products.

Links / Dependencies

[Social and Cultural](#) [Size](#) [Testing](#) [Aesthetic](#) [Material](#)

Standards & Specifications

The prototype product has been approved by the various medical device regulatory agencies and we would need to stay within these specification as we push the product to manufacture.

Designate responsibility for future proofing the project against changes in the specifications and Legal implications.

Links / Dependencies

[Social and Cultural](#) [Legal & IP](#) [Politics](#)

Legal & IP

- Appoint teams responsible for the legal aspects of the project (inclusive of but not limited to)
 - Banking and finance
 - Civil litigation and dispute resolution
 - Commercial/Corporate Law
 - Consumer Law
 - Employment Law
 - Environmental Law
 - Insurance Law
 - Taxes

- Intellectual Property
 - Designs
 - Technology
 - Processes
 - checking and registering patents,
 - trademarks,
 - commercial agreements to issue licences.
 - Customer lists and data

Links / Dependencies

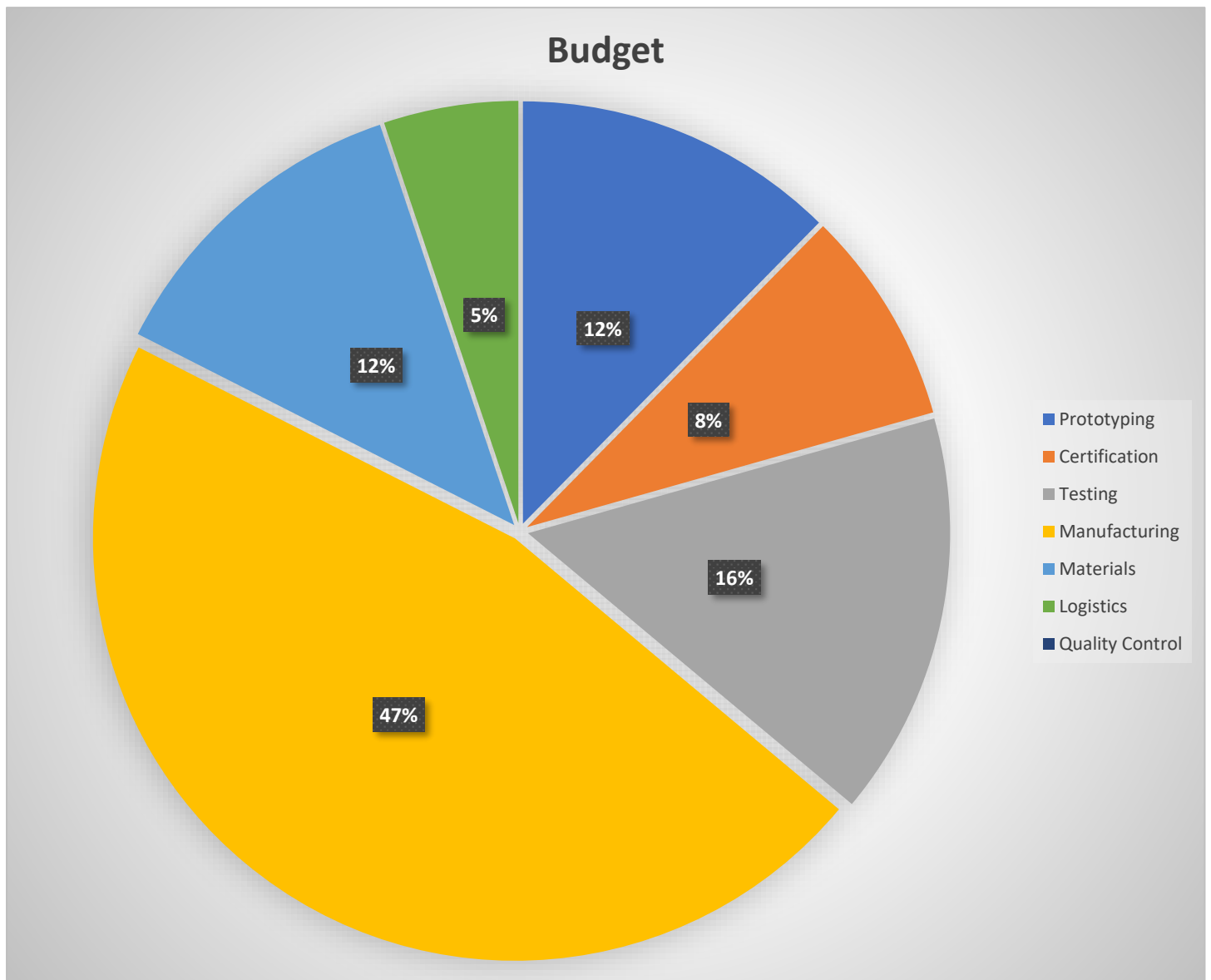
[Documentation](#)

[Standards and Specification](#)

[Politics](#)

Product Cost

A breakdown of cost



Testing

- **Non-Functional Testing**
 - Product Architecture
 - Information Security
 - Compliance
 - Disaster Recovery
- **Operational Testing**
 - Performance,
 - Stability
 - Maintainability
 - Backup recovery
- **Regression Testing**
 - After each change request or update, test to ensure all existing operations are unaffected.
- **User Acceptance Testing**
 - User interfaces
 - Functional behaviours
 - Test cases

Life in Service

- **Development**

- Processes
- Supply chain
- Distribution

- **Introduction**

- Gather market intelligence.
- Low volume of sales

- **Execution**

- Moderate sales volume 500,000 units in the 1st year
- Improving processes to meet demand.

- **Maturity**

- High volume of sales
- 5,000,000 units in the 2nd year

- **Decline**

- Recall redundant products for recycling.

Links / Dependencies

[Processes](#)

[Shipping](#)

[Manufacturing Facility](#)

[Circular Economy](#)

Product Life Span

- **Physical**

- How many tests with the product carry out
- How long will the materials last?
- How many hours can the touch screen work for
- How many times can the battery be recharged.

- **Virtual**

- How long will the software be supported?
- How long will the data be kept?

- **Calibration and Warranty**

- How often does the product need to be calibrated?
- How long is the warranty?

Links / Dependencies

[Processes](#)

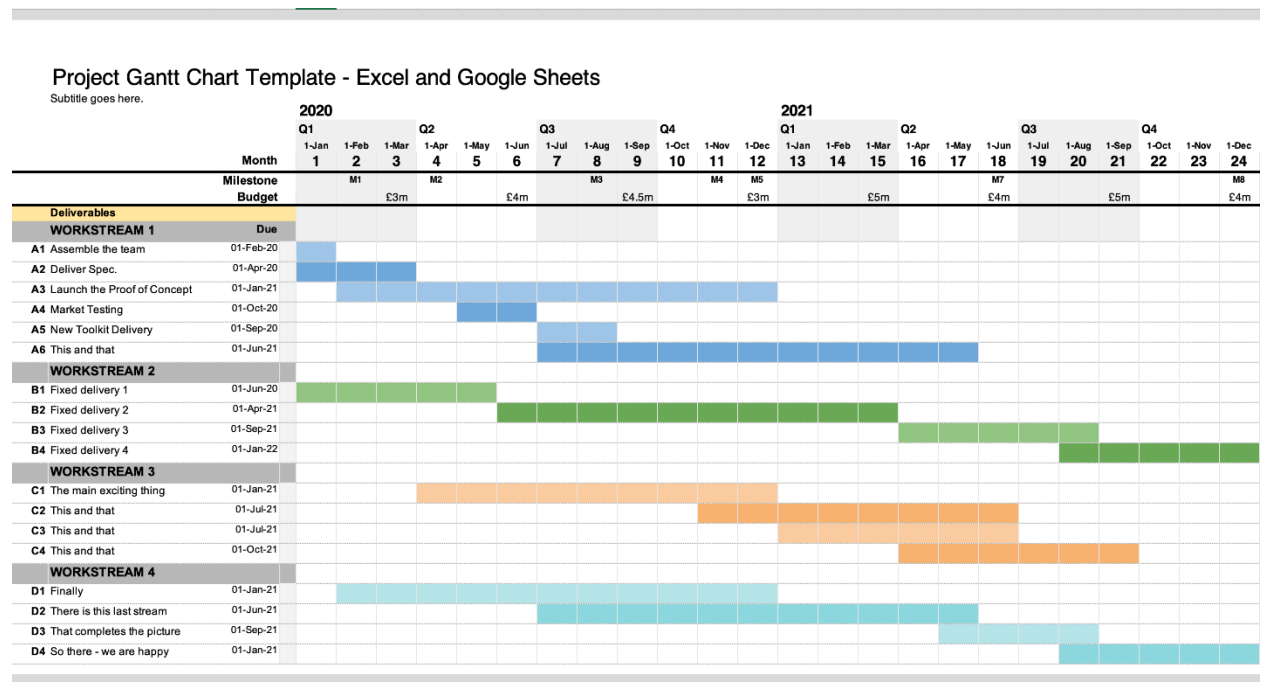
[Testing](#)

[Reliability](#)

[Repair & Maintenance](#)

Time Scale

To maximise the potential of this project we must get the product to market as soon as possible. a Gantt chart must be produced with milestones. (see example below) [Project Management Excel Gantt Chart Template Collection \(lesboucans.com\)](#)



○ Production output.

- Produce 9615 per week in the 1st year.
- Produce 96150 per week in the 2nd year.

Links / Dependencies

[Processes](#)

[Shipping](#)

[Manufacturing Facility](#)

[Circular Economy](#)

Weight

- **Modularity**
 - Weight of a battery $45g \times 4 = 180g$
 - Extra components to incorporate redundancy and allow for removal.
 - Extra fixings and fasters to allow the removal and refitting of modules.
- **Weight of the Product**
 - The user should be able to operate a tool with one hand.
 - 0.4kg (1 lb) for precision tools to allow for good control.
- **Centre of Gravity**
 - The heaviest components in the product must be located as close to the wrist as possible to prevent fatigue.
 - The screen should also be located around the centre of the wrist to remove the need for moving.
- **Logistics**
 - 40ft container weigh 3,750kg and can be loaded to a maximum gross weight 26,300kg. Leaving 22550kg inside the product.
 - A euro pallet weights 24kg x 48 pallets = 1,920kg of pallets
 - Each product including packing must be below 1.1kg including packaging.

Links / Dependencies [How many pallets fit in a 20-ft and 40-ft container | iContainers](#)

[Repair and Maintenance](#)

[Size](#)

[Testing](#)

[Aesthetic](#)

[Material](#)

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