# CHALLENGE BASED INNOVATION

PHASE 2 WHITE PAPER

ENDO AWARE National Endometriosis Screening Program

ENDO BOT

WELLNESS WHEELS

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Design Factory Melbourne · CBI A³

ATTRACT

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SWINBURNE UNIVERSITY OF TECHNOLOGY

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*Figure 1. SDGs 3: Health and Wellbeing. Image source: UN SDGs.*

# Contents



# Executive Summary


The United Nations Sustainable Development Goals (SDGs) have been set up to create sustainable change on a global scale. It tackles 17 goal areas, covering climate change, economic growth, education, poverty and health (The 17 goals | sustainable development, 2022). The SDGs have been a pillar for the Challenge Based Innovation (CBI A3) projects, with this particular project looking at SDG #3: Good Health and Wellbeing for all. Our design team established several key areas under this goal to achieve improvements in health and wellbeing in Australia by 2030 using deep technologies.

We are looking at the chronic condition, endometriosis, and the lengthy and delayed diagnostic journey that women and those with a uterus have to go through in Australia. We are addressing the lack of awareness around the condition, lack of available technologies and lack of access to healthcare options.

EndoAware is a population based screening program designed to quicken the diagnosis journey for women with endometriosis and educate Australians on reproductive health. The program will be made accessible to those living in regional and rural areas via transportable consulting rooms, Wellness Wheels, and progressive imaging technology, EndoBot. EndoAware could shorten diagnosis times for the condition from 6-8 years to just a few days, helping women to mitigate symptoms and risk, improve their quality of life, and empower people to voice their health concerns.

Problem Space

# Endometriosis

## What is Endometriosis

Endometriosis is a chronic condition where the tissue that would normally line the uterus grows in other areas around the body. It can cause severe abdominal pain, fatigue, heavy and irregular menstruation, hormonal disfunctions, organ fusion, infertility, and other health risks if left untreated (Healthdirect Australia, 2023; Jean Hailes for Women's Health, 2021b; Zondervan et al. 2020; Endographics, 2019; Mayo Clinic, 2018). In fact, women with endometriosis are more likely to have other co-existing health conditions that affect their day-to-day life as well, including adenomyosis–where the endometrium grows into the muscle of the uterus–uterine fibroids and eve endometrial cancers (Zondervan et al., 2020).

## Delayed Diagnosis

More than 11% of women are affected by endometriosis in Australia (Healthdirect Australia, 2023; Healthdirect Australia, 2019; Endometriosis Australia, n.d.), yet, it still takes an average of 6-8 years to accurately diagnose (Healthdirect Australia, 2023; Jean Hailes for Women's Health, 2021a; Bontempo & Mikesell, 2020; Husby et al., 2003; Endometriosis Australia, n.d.).

## Lack of Awareness

This is due to a lack of awareness around endometriosis and women's health in general, and diagnostic tools that can present inaccurate results (Jean Hailes for Women's Health, 2021b; Chassang et al., 2010) and can be quite time-consuming (Melbourne Radiology Clinic, 2023).

## Symptoms

Women who present with symptoms of endometriosis are told that they are normal and expected for menstruation, and then prescribed some form of contraceptive to balance out hormones and regulate menstruation and therefore, tamper down symptoms. Symptoms that women or people with a uterus may present with include excessively painful periods and/or chronic pelvic pain, painful sexual intercourse, bowel movements and/or urination, fatigue, nausea and/or abdominal bloating (Healthdirect Australia, 2023; Jean Hailes for Women's Health, 2021b; Endographics, 2019; Mayo Clinic, 2018).

Long-term, symptoms may present as infertility, depression, anxiety, and/or distressing risk to other internal organs (Healthdirect Australia, 2023; Jean Hailes for Women's Health, 2021b). The contraceptive and/or pain medication does not provide long-term treatment for the internal symptoms of endometriosis and may lead to an eventual tolerance build-up which could impact the medications effectiveness (Barbara et al., 2021). More extreme treatments such as a hysterectomy, the surgical removal of the uterus, is also not considered an effective solution for those with endometriosis (Healthline, 2021; Healthdirect Australia, 2019).

## Current Technology

For those who are supported by doctors for their symptoms, they can be sent for various blood tests, magnetic resonance imaging (MRI), and painful pelvic ultrasounds, oftentimes providing very little in the way of a diagnosis due to inaccurate results or an inability to view results clearly (Jean Hailes for Women's Health, 2021a; Jean Hailes for Women's Health, 2021b). Currently, the only accurate way to diagnose endometriosis is via laparoscopy, an invasive keyhole surgery to physically observe endometrial tissue growth and scarring outside the uterus (Jean Hailes for Women's Health, 2021a; Endographics, 2019). Even after receiving a referral for a laparoscopy, wait times in the Australian public health system can be significant (AIHW, 2022; Australian Patients Association, 2021; VAHI, n.d.), allowing more damage to be done to the body in that time.

## Stigma and Education

Our research found that Australians have a difficult time speaking about their personal reproductive health because of stigma (Bontempo & Mikesell, 2020; Clarke, 2009). Although sexual health and education is embedded into the Australian curriculum from primary school (ACARA, n.d.), there is not enough emphasis on maintaining and expanding knowledge, which ultimately contributes to people, especially women, having a difficult time voicing their concerns. They do not feel well-equipped with their own knowledge, they are embarrassed or uncomfortable with the topic, or they are worried about being ignored by their doctor (Sims et al., 2021).

## Diagnostic Limitations

This combination of stigma, lack of women's health education, and limitations in tools and technologies causes lengthy delays in diagnosing endometriosis. Researchers are unsure of the exact cause of endometriosis (Jean Hailes for Women's Health, 2021b) and as a chronic condition, there is no permanent cure, but there are medicated solutions to assist in symptom management (Barbara et al., 2021; Jean Hailes for Women's Health, 2021b). Doctors often prescribe contraceptives or pain medication for management and assist in reducing the severity of symptoms and aid in mitigating further damage.

These solutions are non-permanent and do not aid everyone in the long-term. Medication may become ineffective if tolerability and adherence is not addressed appropriately per each individual with their healthcare provider (Barbara et al., 2021) and where physical tissue growth is still a cause for concern that would need to be addressed more drastically through further surgeries (Healthline, 2021; Healthdirect Australia, 2019).

# Future Context

Our vision of 2030 shows that there is a new focus on responsible resource consumption, with emphasis on renewability and sustainability of energy, resources and materials.

Following the COVID-19 pandemic, an increase in remote work leads to metropolitan city populations decreasing as many move to regional areas following a boost in regional infrastructure and technology ventures to support flexible work-from-home and fly-in-fly-out models of employment. Advancements in technologies such as autonomous vehicles and artificial intelligence have pushed for legislation in ethics, safety and long-term applications to benefit the long-term health and well-being of Australians.

The shift in population out of metropolitan areas has put a boost into urban farming and green-living for the now-vacant spaces in metro areas. Due to the shift in population locales, we see rural and regional infrastructure, like internet, public transport, and general healthcare, meeting up with the same standards as previously met in metropolitan areas and even going further.

These areas are still pushing for more specialised healthcare, like paediatrics, oncology, orthopaedics, and allied health. This need for specialised healthcare, along with the new technologies, has raised interest in the concept of remote healthcare and health at home. Health-led infrastructure would see policies, programs and services becoming the forefront focus in this 2030 future (ARUP, n.d.) and support these new needs and motivations from the community. Long-term health management and telehealth consultations are supported by an increase in the use of Artificial Intelligence (AI),

Augmented Reality (AR) and Virtual Reality (VR) for the sake of medical consultations. There has also been an increase of access to self-management tools, putting people more in control of their health and medical care. This has initiated a push for the safe storage and handling of national health data and medical information, presenting further scrutiny and overhaul in data storage and security on a federal level to promote digital safety.

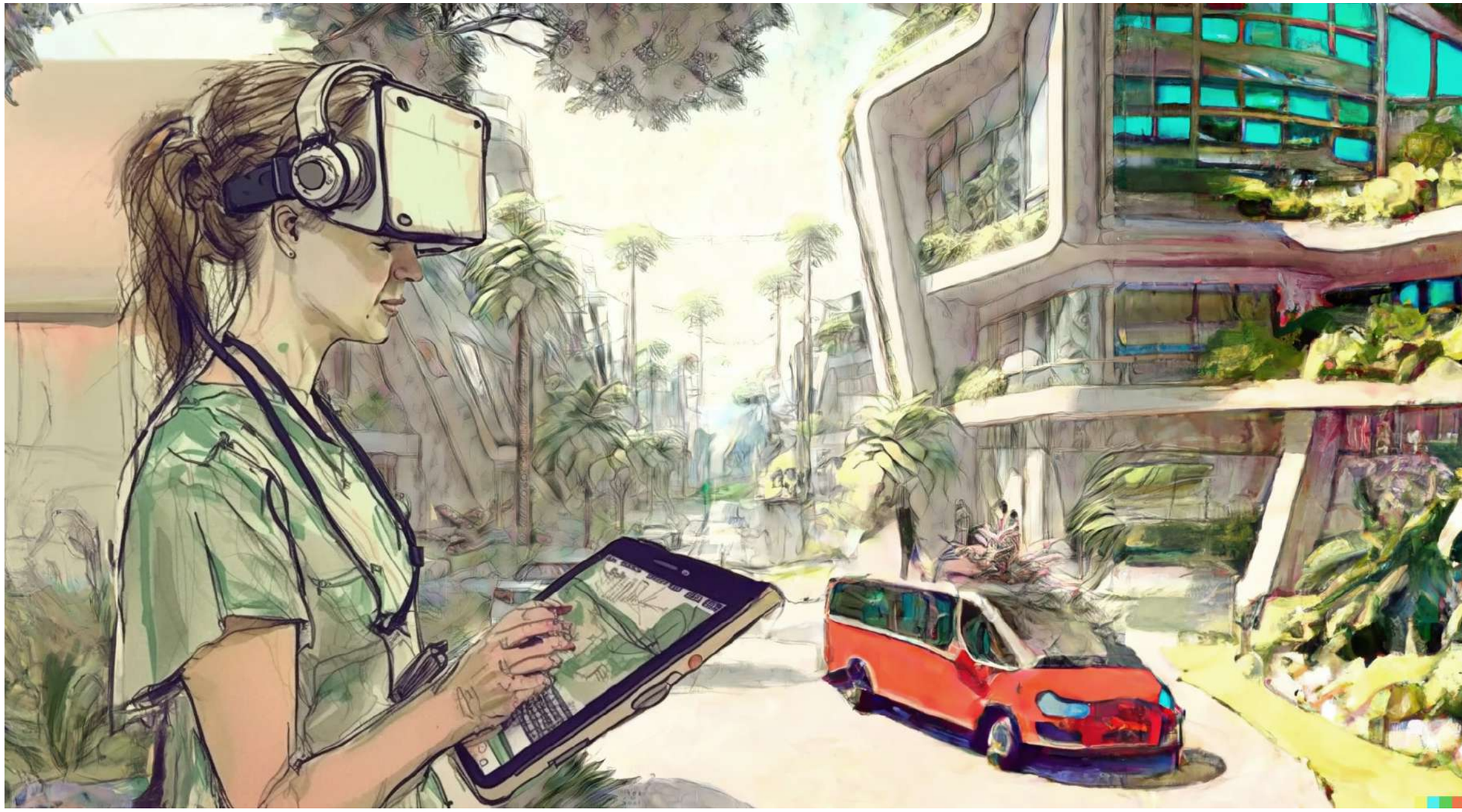


*Figure 2. Future Trends Sketch, generated by Tu Haowei (Howard) through AI assistance.*

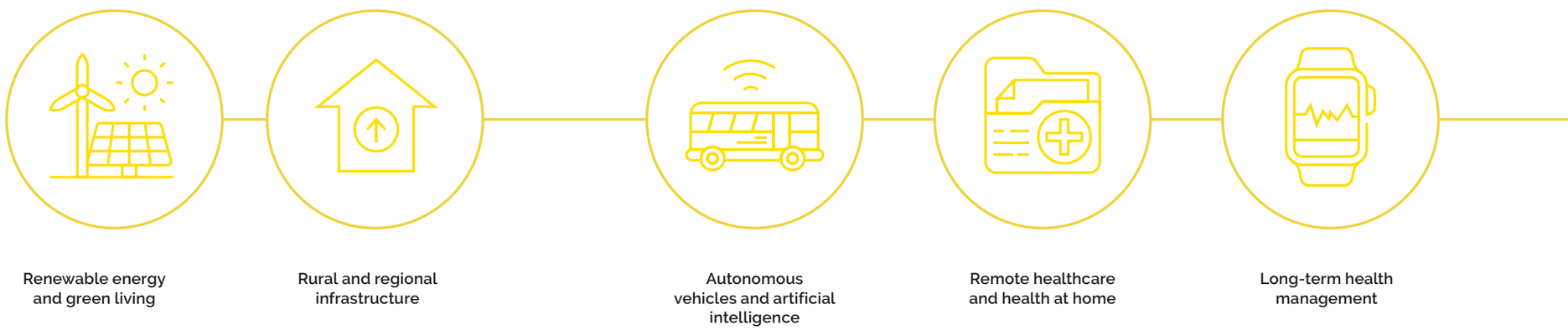
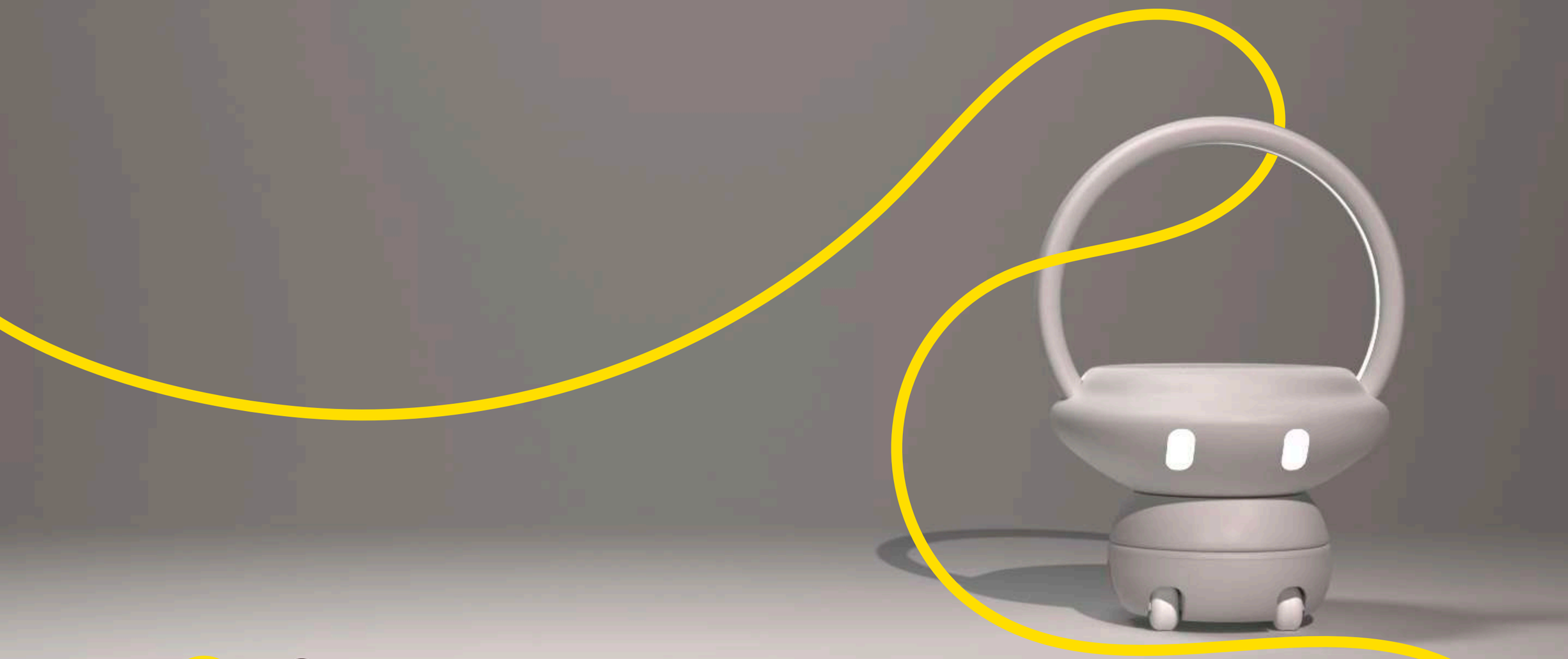



*Figure 3. Proposed Solution Tri-Graphic Banner, showcasing EndoAware, EndoBot and Wellness Wheels images. Branding by Tu Haowei (Howard). Digital Renders of EndoBot & Wellness Wheels by Kieran Lewis.*

## Proposed Solution

Our proposed solution is three-fold: EndoBot, Wellness Wheels and EndoAware. Each aiming to tackle the delay in diagnosis and lack of awareness of endometriosis, all while supporting wider regional healthcare access.

*Figure 4. EndoBot. Digital Render by Kieran Lewis.*



ENDO
BOT


*Figure 5. EndoBot and Bed Accessory image. Digital Render by Kieran Lewis.*

EndoBot is our advanced technology solution. A highly efficient and accurate medical scanner that creates a 3D colour image of the body in a matter of minutes. It creates a new level of accessibility to patients in the form of a mobile and customisable scanner, removing the need to invasive procedures. It is around 1 metre in diametre and 1.3 metres in height and features two deep technologies; MediPix3 and HYGER.

It also include an interchangeable base; one base is wheeled, allowing for EndoBot to move around a space (see Figure 4-6), and an alternate base that allows for it to be mounted on bed rails (see Figure 5 & 9). This allows for the scanner to be used in different environments, from medical imaging clinics and hospitals to moving vehilces, like Wellness Wheels, and unique environments, like personal homes of differing terrain.

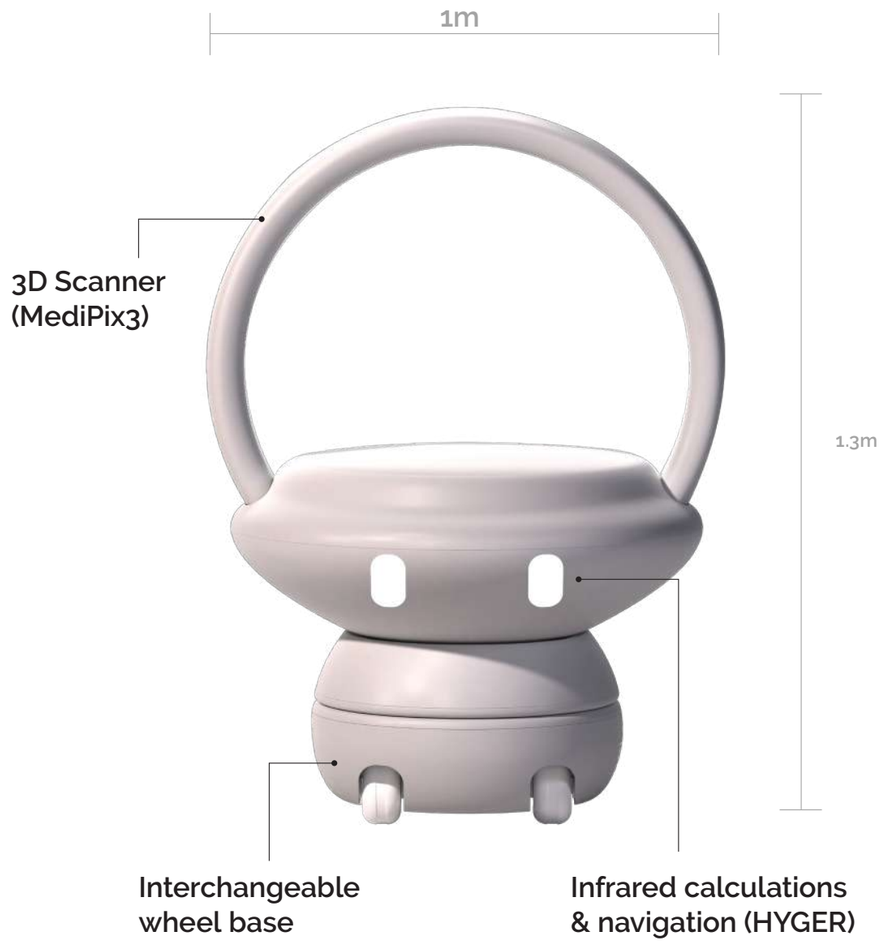



*Figure 6. Annotated Features of EndoBot. Digital Render by Kieran Lewis.*

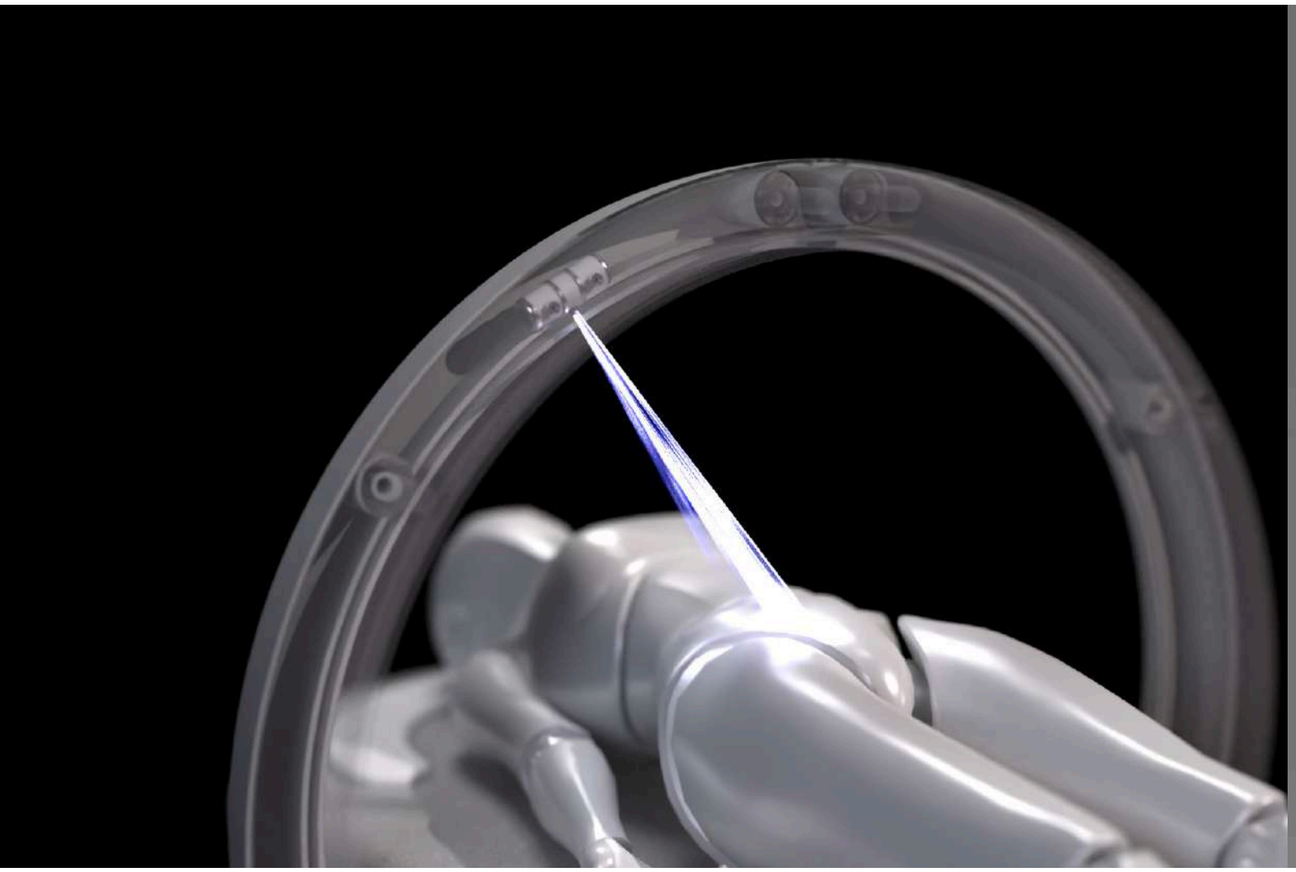


*Figure 7. Transparent view of MediPix3 technology within EndoBot. Digital Render by Kieran Lewis.*

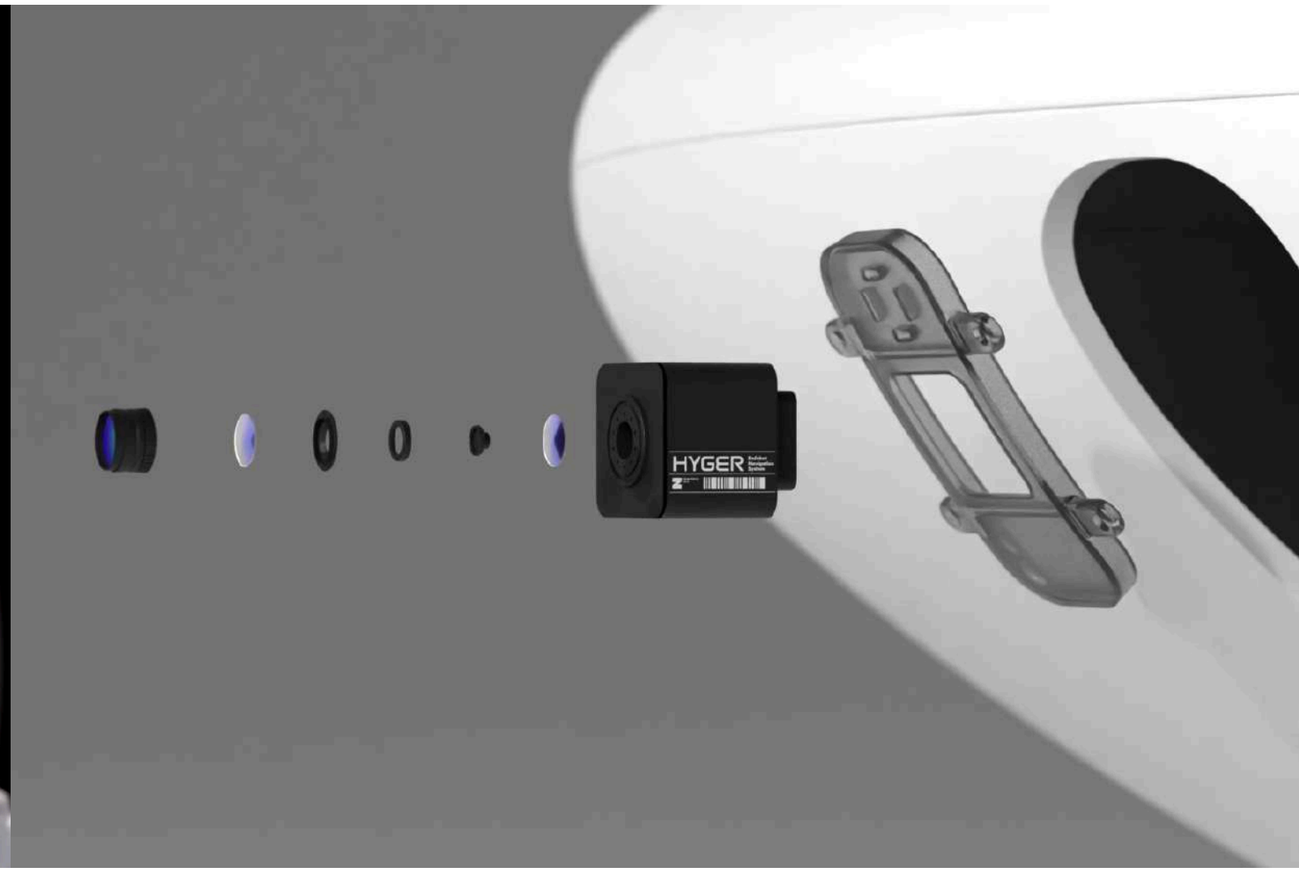



*Figure 8. Expanded view of HYGER Technology within EndoBot. Digital Render by Kieran Lewis.*

## CERN TECH | MEDIPIX 3

MediPix3 creates a 3D colour x-ray image scan, which can be analysed by doctors and specialists for the purpose of identifying anomalies and, in this case, the presence of enometrial tissue in the pelvic cavaity. This means that practitioners will be able to more easily distinguish the tissue without the need for invasive surgery, making the diagnosis of endometriosis much faster and safer (see Appendix A).

MediPix3 creates an extremely high resolution image (see Figure  7.1), with scanning times currently at only a few minutes. According to co-founder of MARS BioImaging, Professor Anthony Butler, the continuous development of MediPix3 means that scan times could be as quick as 3-4 seconds by 2030.

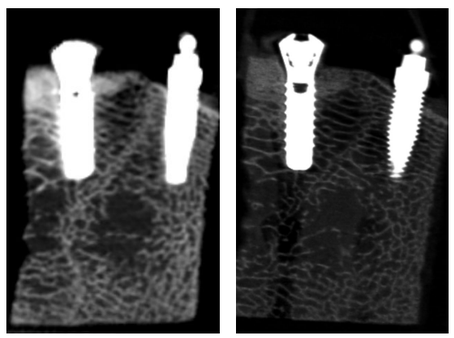


*Figure 7.1. Scan resolution using Current Technologies (left) and scan resolution with MediPix3 technology.*

## ATTRACT | HYGER Endobot Navigation System

HYGER is an infrared technology that measures light and translates them into electrical data points of the surrounding space. It is used in EndoBot to assist scanning accuracy by making adjustments to the EndoBot arch as it follows any micro-movements made by a patient during a scan (see Appendix B).

It can also make EndoBot more autonomous in the future where it could be callibrated to attend to scan by itself, giving time back to doctors to attend to other appointments. Further applications see the possiblity of HYGER being used in self-navigating vehicles, like Wellness Wheels.

**There are many other existing and developing technologies that will be used in our solution:**

- High speed internet
- Data processing, storage & sharing
- Artificial intelligence
- Green energy infrastructure
- Efficient batteries & fast chargers

*"By 2030, it could be 3-4 seconds..."*

Professor Anthony Butler, MARS Bioimaging

EndoBot is poised to revolutionise women's diagnostic journey of endometriosis by provding high resolution scans of the body's internal organs to detect endometrial tissue, removing the need for invasive dignostic procedures. It will also shorten timelines significantly, with MediPix3 technology provding extremely high resolutions scans in a matter of minutes.

*Figure 9. EndoBot and Bed Accessory showing scanning usability on rails. Digital Render by Kieran Lewis.*

# WELLNESS WHEELS

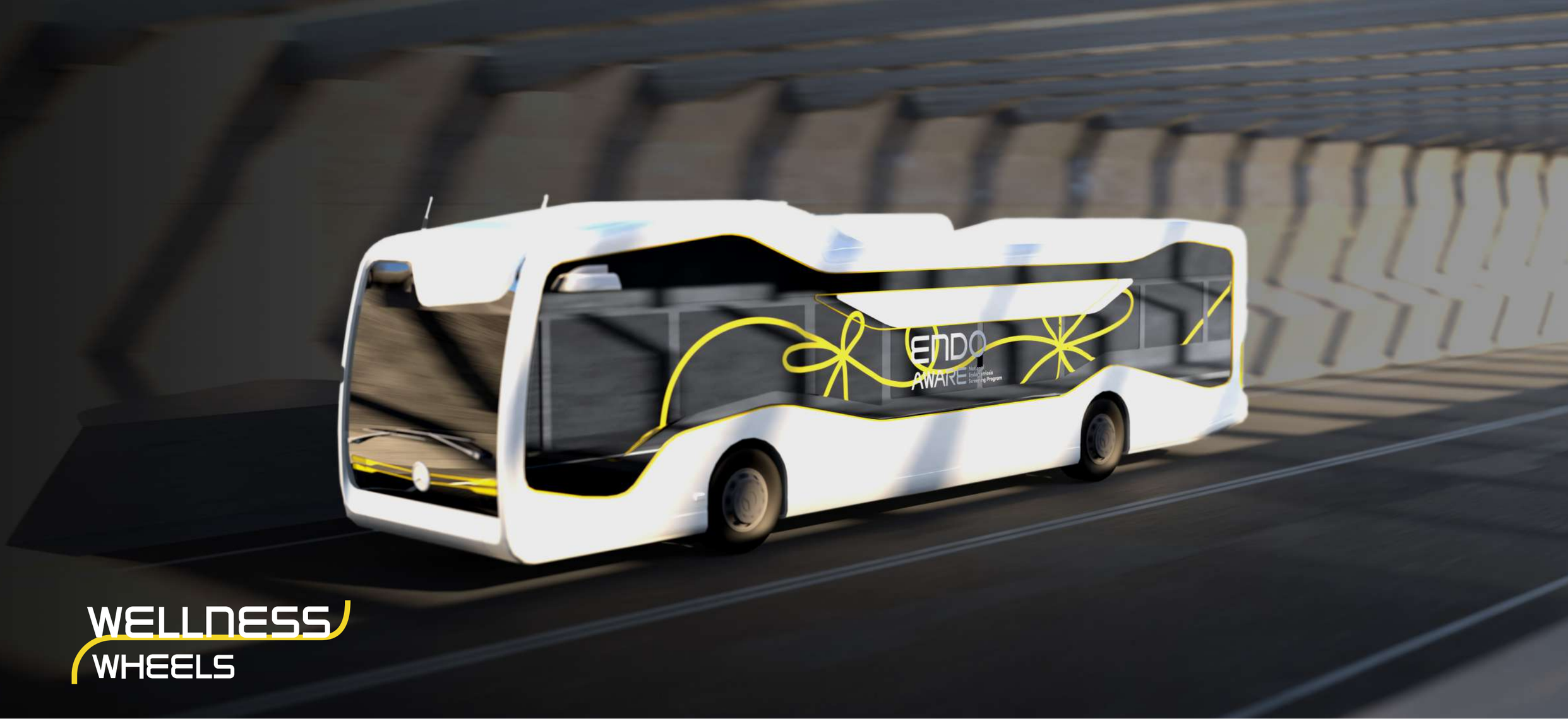



*Figure 10. Wellness Wheels in driving context. Digital Render by Kieran Lewis.*

Wellness Wheels is what will get EndoBot to those far reach places. A self-powered-solar-electric and self-driving vehicle, it will run on a rotating roster to regional areas around Australia that would otherwise maybe not have access to metropolitan healthcare. The bus would be staffed by a medical professional, such as a registered nurse, who would work on a Fly-In-Fly-Out (FIFO) roster to allow flexibility in their employment and best option for worklife balance. On a national level, the EndoAware program would also employ radiology specialists and clinicians to remootely assess and report back on the EndoBot scans taken from Wellness Wheels consultations.

In the weeks prior to the bus' arrival, the local area will be notified of the current schedule and booking system. People will be able to book in for a scan prior to its arrival, though there will be a live waiting-time feature online that will support people who would prefer to have a walk-in appointment during the time the bus is in the area. From our technology research with EndoBot, the additional time provided from quicker scan times with the EndoBot scanner will also allow for patients to spend more focused time with their medical professional instead.


*Figure 11. Wellness Wheels internal floor plan showing open layout. Digital Render by Kieran Lewis. Floor plan by Eilish Jackson.*

The bus has a cormfortable and welcoming interior, with a safe and private space to complete the scan with EndoBot as well as a consulting area for patients to discuss their expectations, the scan and their results with the qualified medical professional. This space is flexible and can also be transformed into one larger space that would be used to host EndoAware educational resources.

Follow-up consultations to discuss results of the EndoBot scan would be offered within a few days of the scan, where a patient would be prompted to book a second consultation at the Wellness Wheels prior to its departure from the area. Where the timing doesn't coincide for the 2 week stay of the bus, patients would be offered other options.

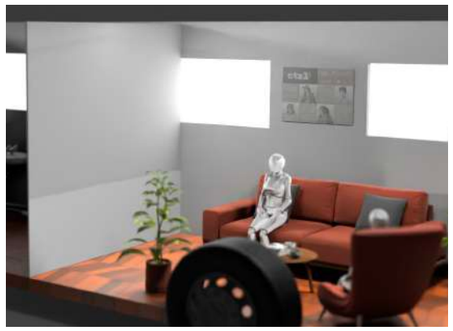


*Figure 12. Wellness Wheels internal floor plan showing private consulation space. Digital Render by Kieran Lewis. Floor plan by Eilish jackson.*

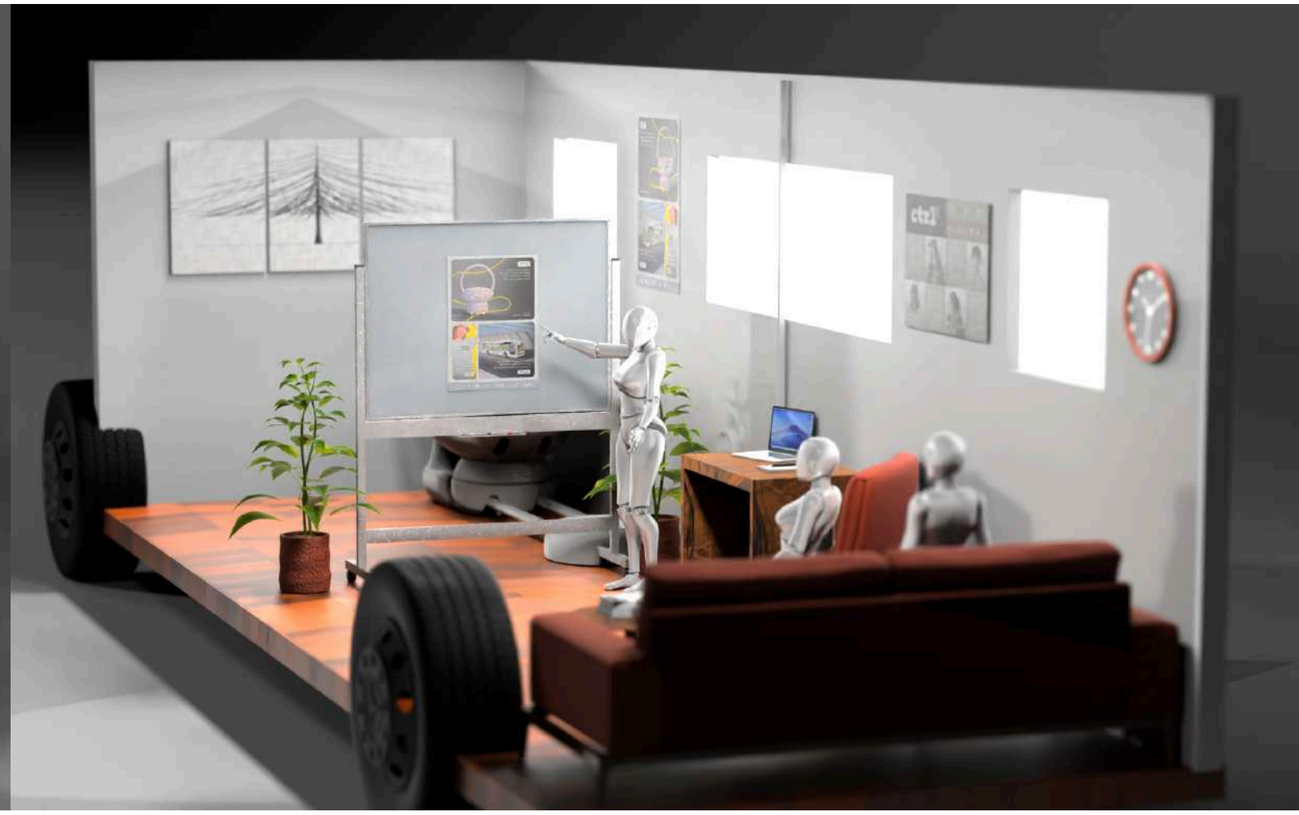


*Figure 13. Wellness Wheels internal floor plan showing open layout space used for education and awareness program in context. Digital Render by Kieran Lewis. Floor plan by Eilish Jackson.*

One such option would be to see where the bus is going next, as peripheral areas would overlap with each Wellness Wheels areas and still be maintained as a local visit for some. Another option would see a virtual option, such as TeleHealth video or phone call appointment in lieu of attending a Wellness Wheels location in-person. There would also be the option for results to be sent directly to the person's general practitioner for consultation at their next doctor's appointment. Scans and results could also be consented by patients to be uploaded to their MyHealth Record for streamlined access for their doctors and specialists.

Additionally to the EndoAware scans that Wellness Wheels would provide, the space will also be used to promote awareness and education around reproductive health. As mentioned, the bus can be altered to one larger space that canbe used for education and allows for resources to be shared and collaborated with the area's population.

In the case that appointments, scans or consultations, are ongoing, the buses flexible usage of enclosed spaces would allow for the EndoBot scanning area to be used for private appointments while the rest of the space to provide information and resources. These resources will be physical on the bus itself, with options that are digital and fully accessible online within the EndoAware program as well.

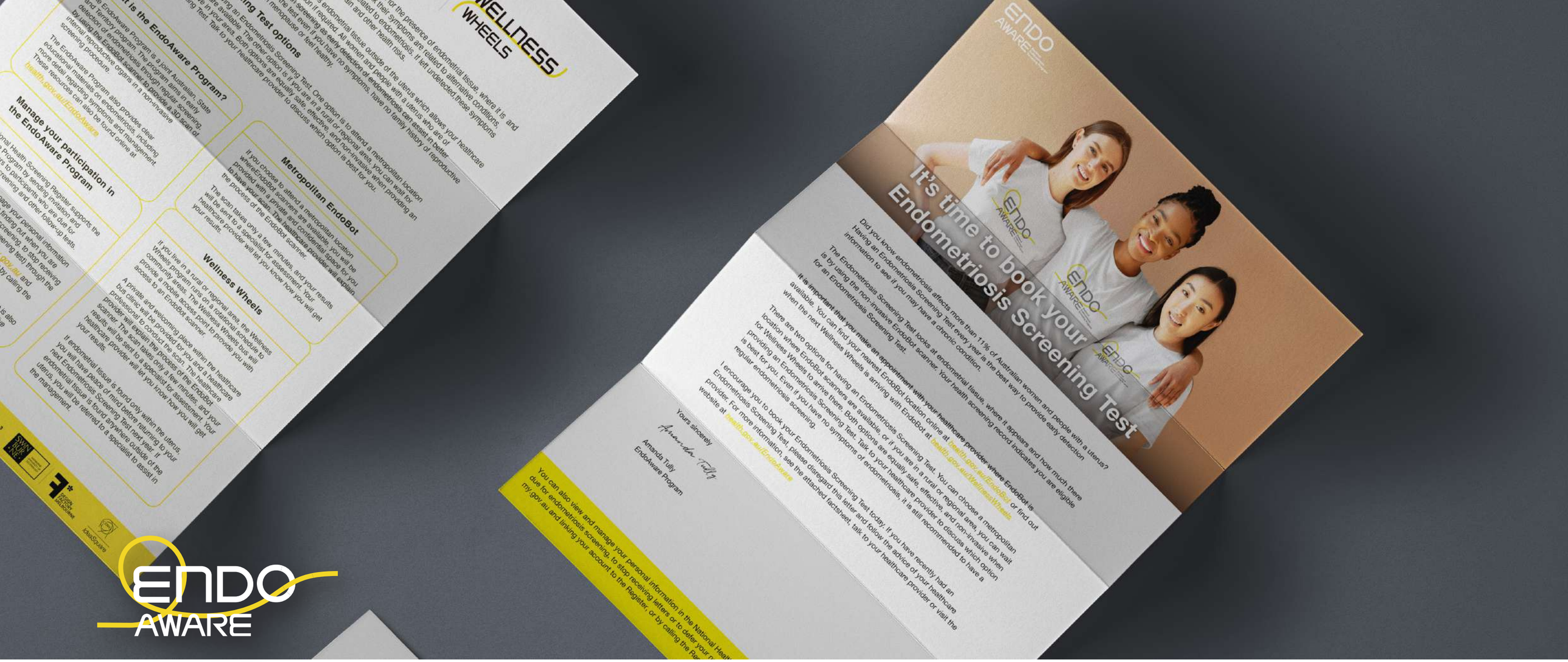



*Figure 14. EndoAware notification letter and fact sheet mock-up. Text by Nildene Spagnuolo. Text inspired by Australia's National Cervical Screen Letters.*

EndoAware is the national screening and educational program that we're proposing to facilitate a smoother diagnostic journey for endometriosis screenings. EndoAware utilises the EndoBot technology for endometriosis screens, and Wellness Wheels for regional access in Australia. It also acts as a promotional and educational system created to increase awareness of endometriosis and other reproductive and gynaecological health concerns. Looking at similar national screens already in place, we're proposing that EndoAware be facilitated the same way as current screens for breast and cervical screens are (Cancer Council, n.d.).

This would include a national registry to manage recommended screening times, store data on previous screens and provide support to those with endometriosis. Around the time that someone might be due for a screen, they would receive communications from the Department of Health, encouraging them to book for their endometriosis screen. They could go to get their screen done with EndoBot, but also if Wellness Wheels might be applicable to them as an option for an Endometriosis Screen.. Following a similar method to current screening programs allows for the familiarity of what is known to reach more people around Australia, while also providing new and soon-to-be normalised scanning procedures with EndoBot and healthcare access with Wellness Wheels.

From now until 2030, we have thus established a roadmap to implement our solution and better understand how EndoAware, EndoBot and Wellness Wheels will fit in the grander scheme of things.

EndoAware's educational program would include instances of physical information points, where Australians might be encouraged to take a physical pamphlet or piece of information with them or would be seeing wide-access information such as posters or other advertisement. Any physical resources would be created with sustainably sourced materials, vegetable and skin-safe inks, and biodegrable with no significant short- or long-term impact on the natural enviornment or health of the planet.

By 2030, we would see resources and education becoming primarily digitised and expand through up-and-coming technologies, including thorugh artificial intelligence, holographics, and other online Internet-of-Things technologies. The expansion of these information points would allow for a wider audience to be reached through language and accessibility.

# Endo Aware System

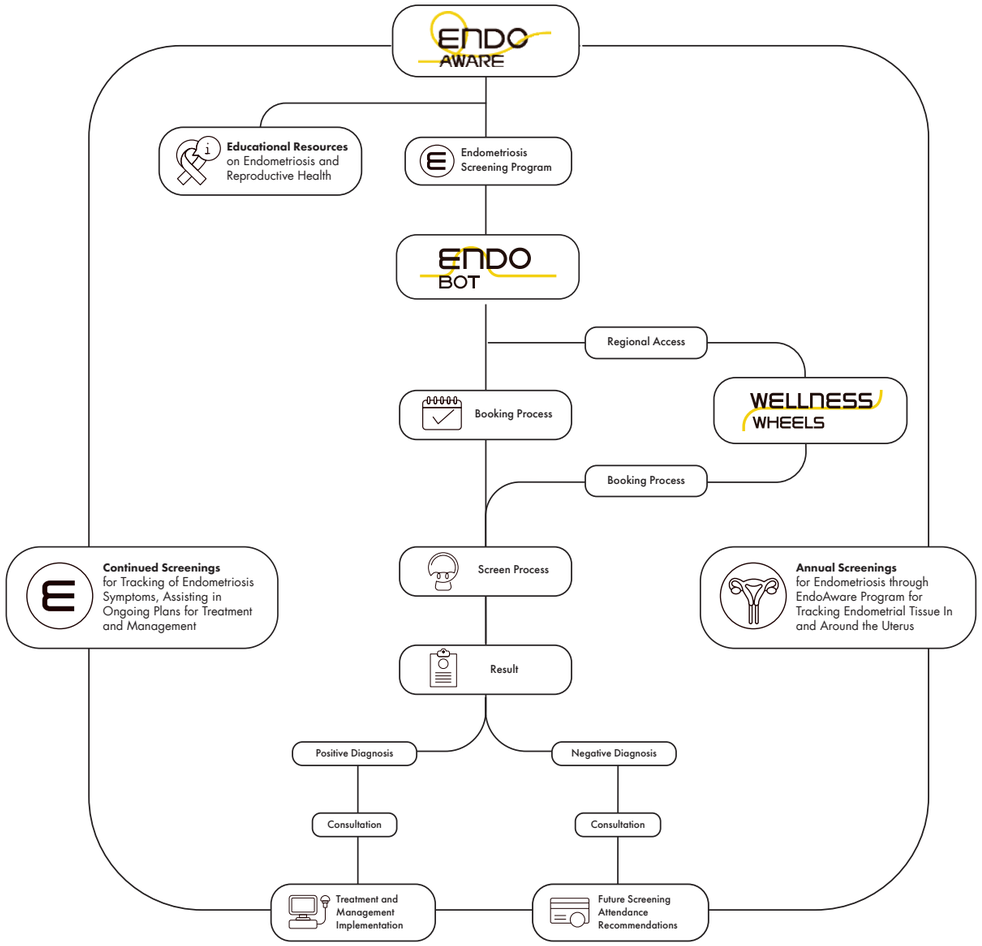



*Figure 15. The EndoAware System Map, showing how all parts of the solution work together. System Map by Nildene Spagnuolo. Digitsed by Tu Haowei (Howard)*

Eligible participants will be alerted when they may be due for an endometriosis screen and when the program is in their area and will be able to make a screening appointment. During this appointment, a medical practitioner will calibrate Endobot to scan the patient's pelvic area, which will then be sent to the screening registry for analysis by a doctor or specialist.

Once the scan has been analysed, the patient will return to Wellness Wheels to be provided with their diagnosis and a personalised management plan to assist them in managing the condition. If an endometriosis diagnosis can not be determined, they will still be supported and guided towards other services to help them with their concerns.

All will be eligible to return annually for EndoBot screenings, and those who have been diagnosed with endometriosis provided with access for follow-up scans for comparison to manage and assess their condition over time.

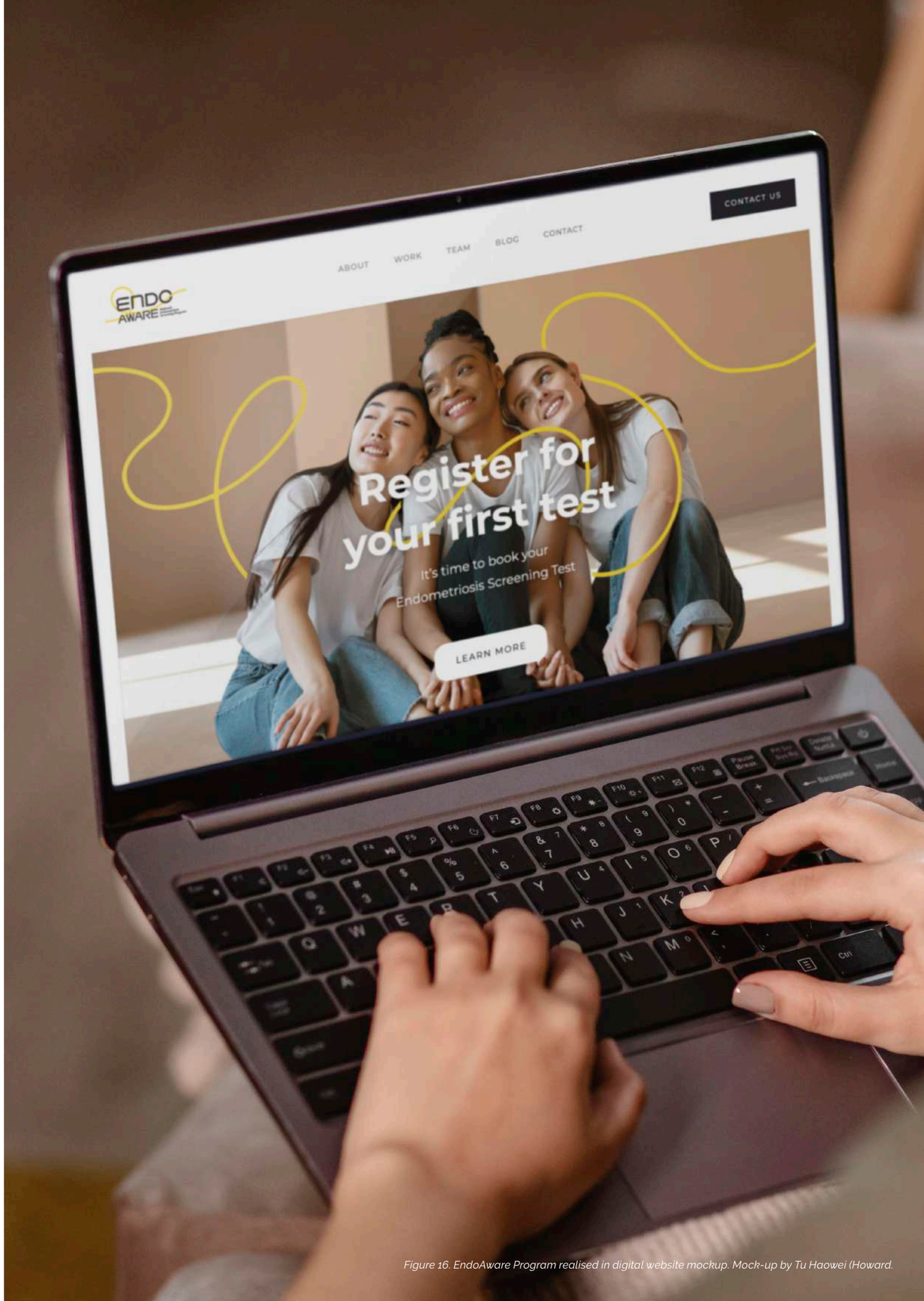



*Figure 16. EndoAware Program realised in digital website mockup. Mock-up by Tu Haowei (Howard.*

SOLUTION

Introduction of Endo and Pain Clinics.

EndoBot initial prototypes incorporated with Hyger and MediPix3 technology. Testing and development begin.

Endometriosis Screening Framework declared to Department of Health.

Educational and awareness program, EndoAware initiated around Australia.

EndoBot established for pilot tests in medical imaging clinics in Melbourne, Sydney and Perth

EndoBot pilot screening program begins in public hospital systems.

Wellness Wheels program developed under EndoAware to provide national Endometriosis Screens in regional areas across Australia.

Endometriosis Screening Framework approved. Results in EndoAware program adapting to include national Endometriosis Screening Register.

EndoBot becomes primary medical scanner in hospitals and medical imaging clinics.

Wellness Wheels becomes portable community health hub in regional areas.

2023 | 2024 | 2025 | 2028 | 2030 | 2050

TECHNOLOGY

MediPix3 scan times down to 30 seconds

Hyger used in safety stops and navigation of small technology (i.e. drones)

Hyger used for spatial awareness in robotics technologies

Hyger technology approved for use in autonomous vehicles

MediPix3 scan times down to 4 seconds

MediPix3 scan times now considered instantaneous/under 1 second per scan

DATA TECH

Advances in the use of Artificial Intelligence

Doubt and risk assessments in the use of AI escalate

Federal government establishes stricter security guidelines for national data management.

New Zealand adopts an umbrella-system to handle citizen patient details under their healthcare system.

Data storage and management system is created at a national level, combining patient detail systems under one umbrella-system

Data security becomes more prevalent in the wake of mass cyber attacks on Australia's global organisstions.

Data security utilises AI protocols to establish firewalls and aggressive protection of information.

WORKFORCE

Call for more flexible work within healthcare.

Federal government introduces free healthcare education; leads to increase in healthcare staff.

AI regulations are defined to ensure no ill-intention in security systems

Work-From-Anywhere (WFA) and Work-From-Home (WFH) national guidelines streamlined and established in the everyday workplace

Manual processes regarding data management are also streamlined to a national standard

Healthcare workers in Australia are encouraged to up-skill within their fields through funded education

RENEWABLE FUTURE

Budget calls for areas of health and education.

Solar energy incentive plan rolled out

Minimum standards for FIFO workers is increased in budget nation-wide, providing circular economic growth for local travel and accommodation

Renewable energy consumption rises to match fossil fuels

OHS audits are rolled out under a national system to ensure quality standards of work in all fields

Renewable energy consumption surpasses fossil fuels

OTHER

Incentive plan for NBN is rolling out

Medicare rebate rises to 85% of current consultation costs.

Increased cost of living has pushed major numbers into regional and rural areas.

Call for infrastructure upgrade in rural and regional areas to accommodate influx of population move

Wifi in regional and rural areas now streamlined to national standard.

Partial bulk-billing at GPs due to discrepancy in cost of Medicare calls for increased rebate to match increase in cost of living and other medical expenses.

City centre population has diminished; abandoned buildings are being repurposed for urban farming and renewable energy sources

Medicare rebate tax brackets are amended to include voluntary tax-deductible contributions up to $3,000 per person per Financial Year

*Figure 17. The EndoAware Program Implementation Roadmap on how to get this to 2030*
*Map designed by Tu Haowei (Howard). Map developed by Nildene Spagnuolo & Tu Haowei (Howard).*

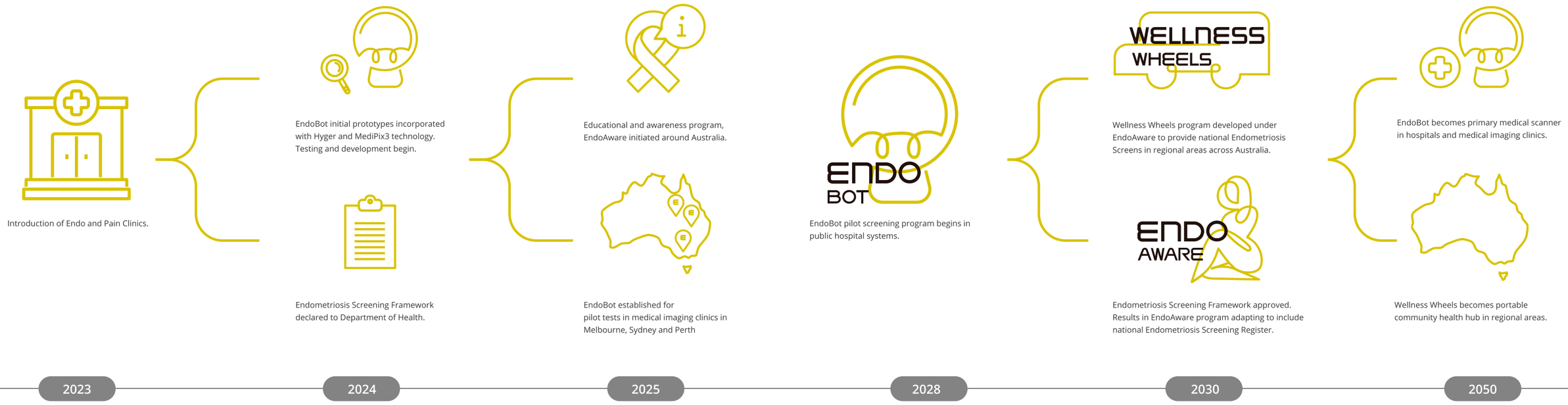



*Figure 18. The EndoAware Program Implemenation Roadmap focusing solely on the solution's progressiont o 2030 and beyond. Map designed by Tu Haowei (Howard). Map development by Nildene Spagnuolo & Tu Haowei (Howard).*

## 2023-24

With the recent introduction of Endometriosis and Pelvic Pain Clinics by the Albanese Government, Australia is looking to establish 16 to 20 clinics over the next four years under an allocated $58.3 million dollars of the 2022-23 budget dedicated to addressing medical assistance, treatment and research for endometriosis and pelvic pain (Department of Health and Aged Care, 2023). Alongside this timeline, we envision an increased push for education and awareness surrounding reproductive health and chronic conditions that will go towards

supporting our EndoAware solution. Over 2023, the EndoAware program will be presented to the Department of Health, following the national population-based screening framework. While awaiting government decision, further pilots and resources are able to be implemented to support the screening programs' viability, and by 2024, EndoAware's education resources will begin being implemented across states and territories alongside the Endometriosis and Pelvic Pain clinics.

## 2025-26

An EndoBot pilot trial will be established in public hospitals by 2025, looking at building data on how the scanning tools will work efficiently and more accurately than current diagnostic tools for endometriosis. The data from this pilot would also showcase how the scanning programs would be established in metropolitan areas and go to support the EndoAware program that has been presented to the Department of Health in the two years prior. The pilot data would also assist in any amendments to the overall program and also to EndoBot itself.

The pilot would further expand to medical imaging clinics as well, expanding out of hospitals and the Endometriosis and Pelvic Pain clinics. The pilot would lead to a push for regional access to EndoBot and general healthcare, which would result in the introduction to a Wellness Wheels pilot, supporting the accessibility of our proposed EndoAware program to regional areas.

## 2027-28

The year 2027 marks a big year for our EndoAware program – we've hit the 4-year mark on the Endometriosis and Pelvic Pain Clinics introduced in 2023, and with it's end, we see EndoAware being approved and rolled out as it's successor. EndpAware, now approved, would become Australia's national populatino-based screening program for endometriosis using EndoBot. It will be rolled out nationally, utilised in hospitals, medical centres and in most of the established Endometriosis and Pelvic Pain Clinic spaces that remain.

## Beyond 2030

Beyond 2030, we see EndoBot becoming the primary tool in hospitals, medical imaging clinics and emergency vehicles for any sort of medical screen. We see EndoBot's scanning technology, Medipix3, becoming more advanced, with more accurate calibration and scanning capabilites. With the advancement of HYGER technology, EndoBot becomes more autonomous than ever, allowing for self-navigation to patients. In hospital settings, EndoBot's autonomous features means that it would be able to attend to patient rooms directly, giving more time back to medical staff for other patients as well.

We also see Wellness Wheels becoming more consistent fixture in Australia's rural and regional healthcare, providing health hubs to these areas. Wellness Wheels would become more autonomous and energy-efficient in the wake of an increase in renewable energies, particularly in vehicles, and has the opportunity to become more advanced using technologies such as HYGER.

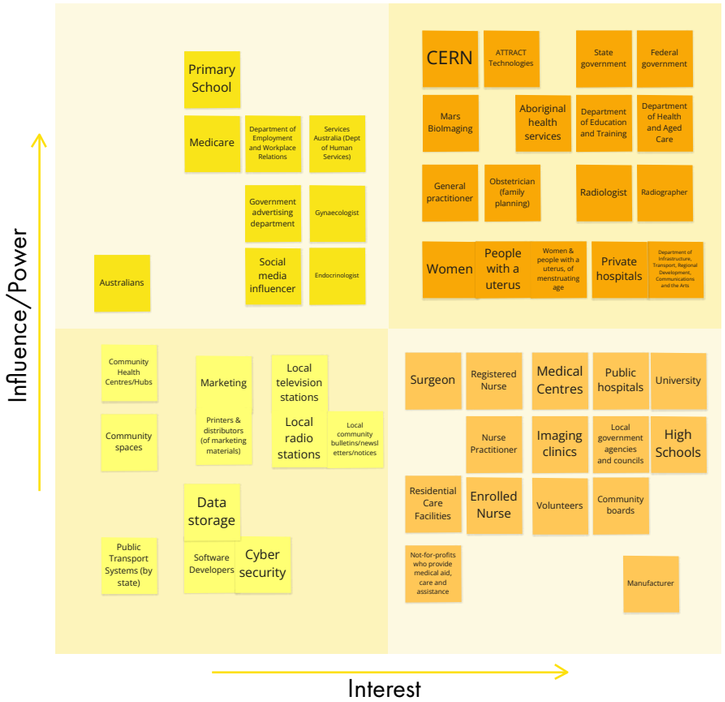



*Figure 19. Key Stakeholders mapped by their Influence & Power versus their Interest. Map developed by Nildene Spaghnuolo, Tu Haowei (Howard) & Eilish Jackson.*

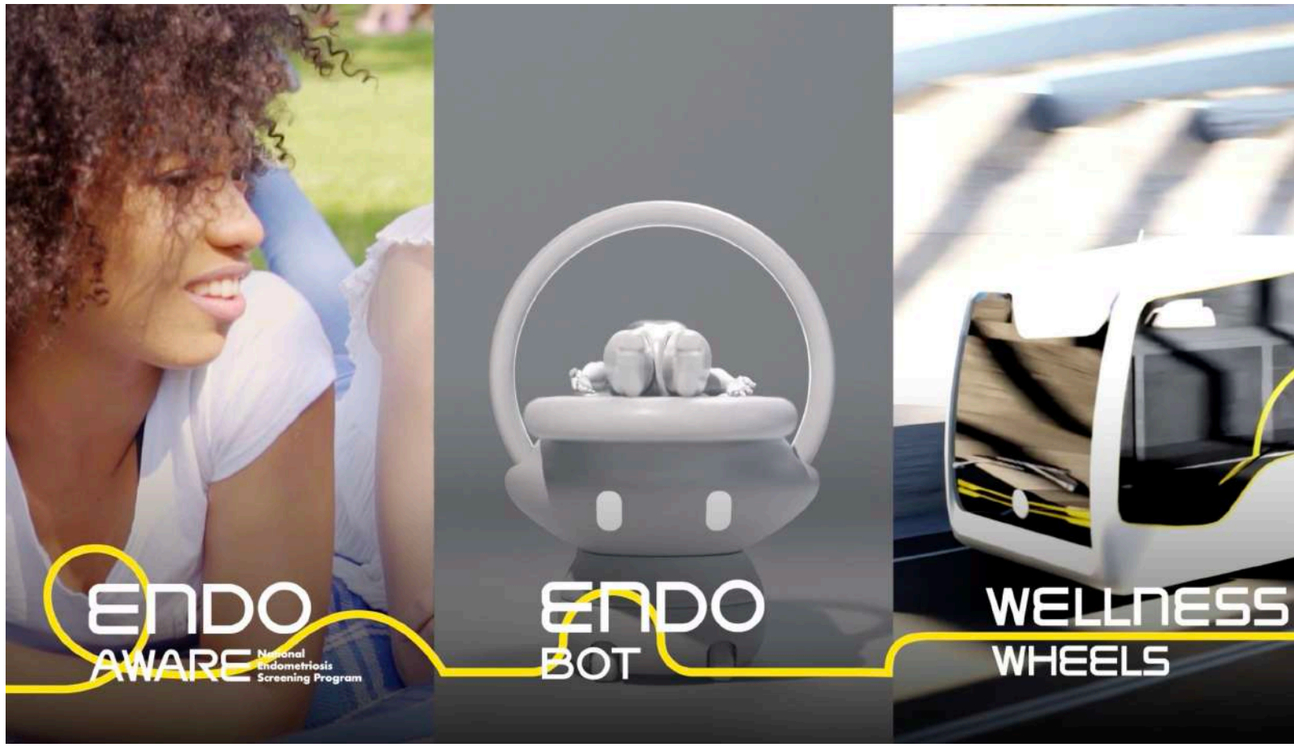



*Figure 20. Proposed Solution Tri-Graphic Banner, showcasing EndoAware, EndoBot and Wellness Wheels images. Branding by Tu Haowei (Howard). Digital Renders of EndoBot & Wellness Wheels by Kieran Lewis.*

# Stakeholders

Looking at our solution, we have established an extended list of potential stakeholders who would be directly involved with our solution in some form, those who would be directly affected by our solution and even those with an indriect contribution or affect. We addressed how we might approach and engage with them to encourage their support and participation in the long-term through consultation, collaboration, advocacy and monitoring.

Matching each stakeholder with the most appropriate approach thorugh consideration to their level of expertise and their influence in the implementation and growth of our solution in the Australian healthcare system. This provided us with insights to how we plan to sustain momentum throughout the implementation we detailed earlier on EndoBot, EndoAware and Wellness Wheels.

# Funding

An estimated cost for manufacturing an EndoBot scanner we estimate to be around $700,000. A break down cost of technology, materials and munfacturing looks like …

Funding for the Wellness Wheels and EndoBot pilot program to run over the course of 20 weeks in 10 regional locations around Australia, staffed by 6 medical practitioners on a fly-in-fly-out (FIFO) roster on a 7-week rotation. … Long-term funding for our solution would see health scans and endometrisois screens covered under the Medicare scheme, supported by funding from those accessing the EndoBot scanner outside of the EndoAware screening program. Additional funding support could come from private health patients accessing the scanner for scans other than the endometriosis screen, and from those who are not eligible to recieve healthcare under the Medicare scheme. …

# Conclusion

EndoAware, with the help with EndoBot and Wellness Wheels, provides an avenue for early detection and education around endometriosis and other womens health issues. By providing access to affordable population-based screening and utilising new non-invasive imaging technologies, people with symptoms with endometriosis will finally be able to receive an early and accurate diagnosis to help them mitigate further damage and symptom severity. EndoAware has the potential to support national health records, allowing for comparative scans to assist in long-term management and continuous encouragement to stay knowledgeable about reproductive health. It will increase awareness through open and encouraged education, deliver critical healthcare services to those who have previously not had access, and most importantly, reduce diagnosis times of endometriosis from several years to just a few days.

Our goal is that by 2030 womens health is a topic that can be publicly spoken about and women are no longer afflicted with delayed wait times for health services and diagnoses. EndoAware is set to revolutionise healthcare for Australian women with gynecological health concerns. Not only will it support a better quality of life for those living with the condition, it will empower women to voice their health concerns.

# Design Team

Communication Design

## *Tu Hao Wei (Howard)*

haoweitu.info

Hello, I am Tu, Hao-Wei, a Communication Designer from Taiwan. I am studying at Swinburne University while participating in the CBI A3 project at Design Factory Melbourne.

My responsibilities include developing distinct identities for our solutions using brand strategies and employing research methods to strengthen our investigation. I find joy in collaborating with interdisciplinary teams and pushing beyond my limits.

User Experience & Communication Design

## *Nildene Spagnuolo*

instagram.com/nildene.design/

Hello, I am Nildene Spagnuolo, a designer specialising in User Experience (UX) and Communication Design. I am pursuing postgraduate studies at Swinburne University through Design Factory Melbourne and the CBI A3 project.

Passionate about design research and people-centred design, I enjoy examining project components and determining the necessary steps to reach the end goal. As I continue my professional journey, I look forward to developing my skills and interest in UX and research.

Industrial Design

## *Kieran Lewis*

kierandesignsthings.myportfolio.com

Hello, I am Kieran Lewis, an Industrial Designer studying at Swinburne University. I have a strong passion for problem-solving, creativity, and connecting with people.

Eager to learn more, I consistently challenge myself by stepping out of my comfort zone. As a designer, I aim to help people and address problems creatively. I believe that design can positively impact people's lives, and I am thrilled to participate in that process.

Industrial Design

## *Eilish Jackson*

eilishjdesign.myportfolio.com

Hello, I am Eilish Jackson, an Industrial Designer passionate about usability, design thinking, and sustainability. A blend of creativity and a touch of nerdiness have endowed me with the "superpower" of radical thinking, driving me to seek solutions.

I have collaborated with diverse clients and cherished each experience. I firmly believe that sustainability and user experience are essential aspects to be integrated into all areas of design.

# Appendix

Appendix A
MediPix3

MediPix3 is a technology that allows one to detect and capture pixels into 3-dimensional colour imaging. It can be applied to x-ray or gamma-ray imaging outputs, as well as other features such as background radiation monitoring, particle tracking and more.

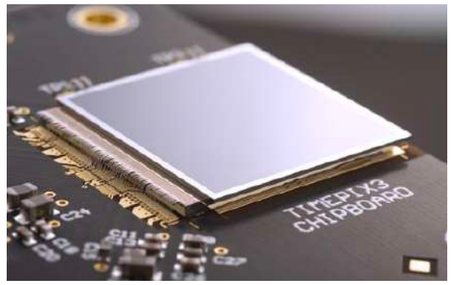



*Figure 21. Medipix3 Chipboard image*

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Appendix B
HYGER

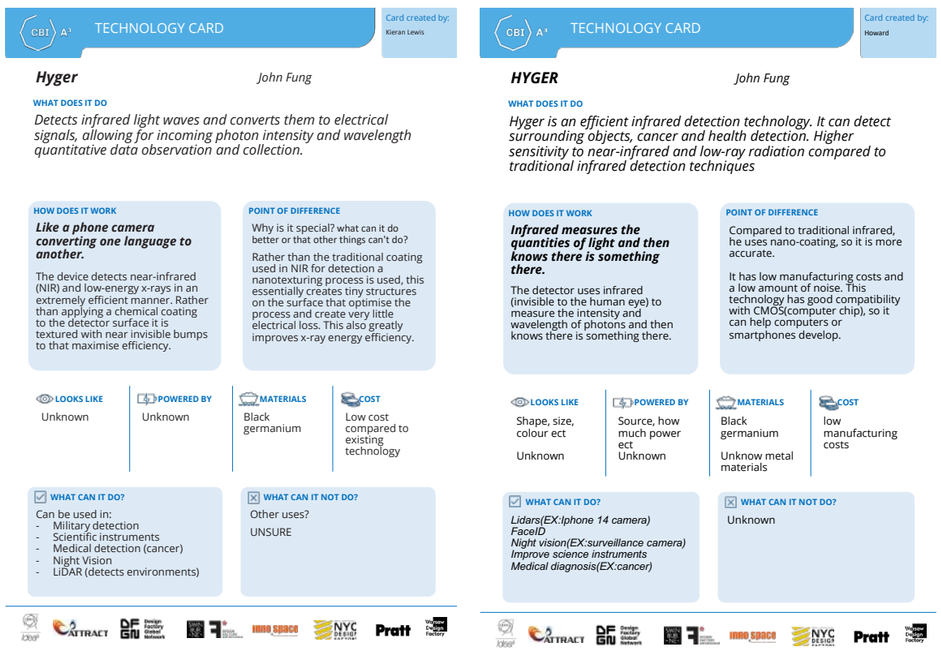


*Figure 22: Technology Cards summarising HYGER Technology. Researched and generated by Howard Tu (right) and Kieran Lewis (left).*

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Appendix C
Stakeholder Engagement Foundation

The foundational theory we used to determine the engagement practices of our intended stakeholders stemmed directly from Figure 23 and allowed for a little bit more of an understanding in how we wanted to prioritise our solution's information from now and into the future. It also allowed us to created the following Stakeholder Roadmap (Appendix D)

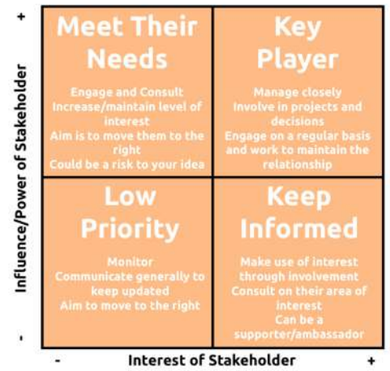


*Figure 23. Stakeholder Map foundational theories, utilised in our engagement mapping (see Appendix D) and our Implementation Roadmap (See Page 24-25).*

Appendix D
Stakeholder Roadmap

Taking from our stakeholder research and tasks, we also established the beginnings of a roadmap to understand how key stakeholders would potentially contribute to our consequent implementation roadmap (as seen on Page 24-25).

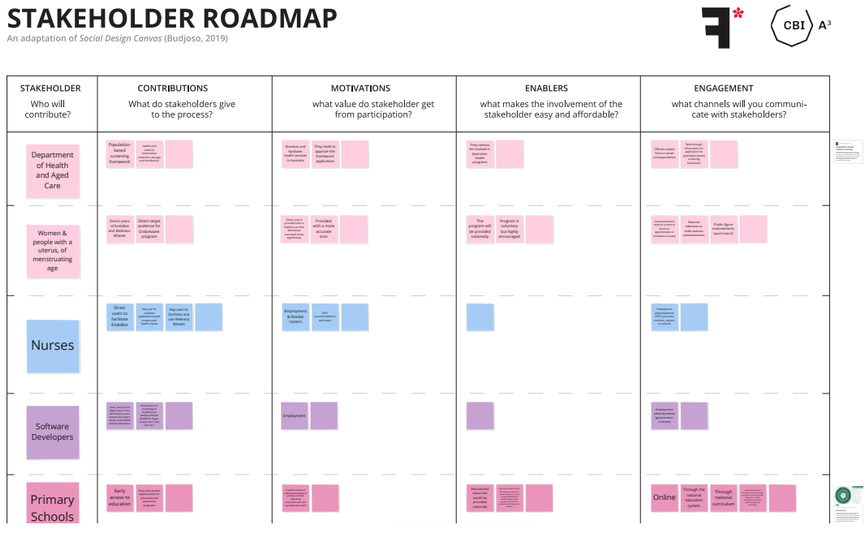


*Figure 24. Stakeholder Map showing relevant engagement.*

Appendix E
Final Presentation Exhibit of EndoAware, EndoBot & Wellness Wheels

Our final presentation included a showcase of our physical prototpes (see Figures 25 and 30). These prototypes were designed to show proof of concept; our Wellness Wheels prototpye (see Figure 26) is made with laser cut wood and acrylic, including a small 3D printed EndoBot and bed. Our EndoBot prototype (see Figure 27) is created through 3D printing, LED lights and motors, EndooBot was also presented as a lifesize printout (see Figure 28) to show human-scale in person for the audience in attendance on the night).


*Figure 25. Final Presentation Exhibit Table including prototpye of Wellness WHeels, EndoBot, our hero posters and our team poster.*

*Figure 26. Wellness Wheels floor layout prototype with a mini EndoBot prototype on railing bed accessory. Developed by Kieran Lewis & Eilish jackson.*

*Figure 27. EndoBot prototype. Developed by Kieran Lewis.*


*Figure 28. Life-size poster of EndoBot.*


*Figure 29. The Ctrl-Z Design Team next to the lifesize EndoBot poster (left) and our EndoAware mock-up table (right). EndoBot is 1.3 metres tall; from left to right, Nildene (1.59m), Eilish (1.6m, Kieran (m) and Howard (m). Photo by Aaron Down.*


*Figure 30. Final Prototype Exhibit Table, showcasing lifesize EndoBot poster, final prototype video, EndoAware mock-ups, Wellness Wheels prototype, EndoBot prototype,our hero poster and team poster.*

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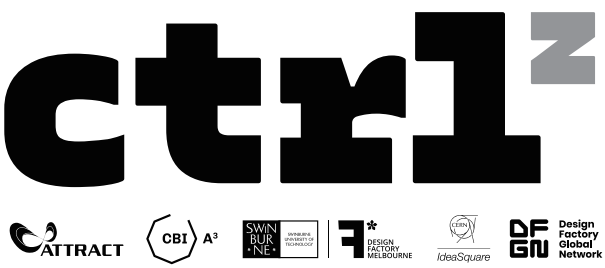
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