



Assistive Reality



GLASS  Tango   Microsoft HoloLens  VIVE  ethereum



Assistive Reality

Company, Products, ICO

Whitepaper 1.9

<https://aronline.io/>

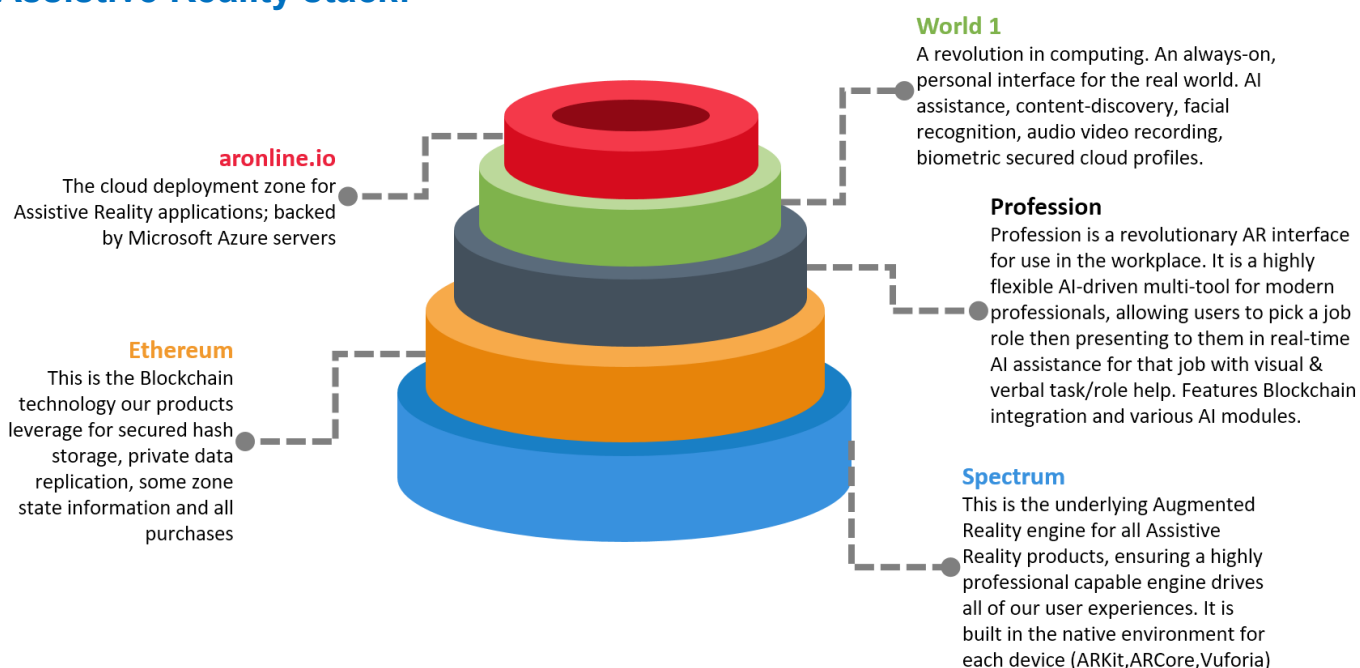
What is the [purpose](#) of this whitepaper?

The purpose of this White Paper is to communicate who we are, what we are working toward in the software industry, and how we integrate features such as AI-assistance, Ethereum Blockchain storage, cloud CPU processing and real-time 3D object recognition to power data and services within our platform applications. Included in this white paper is our 2018 to 2021 project road-map, a brief overview of our goals in both the Enterprise and Home markets, and a benefits summary outlining the details of what we will deliver to the community and when.

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Assistive Reality stack:



Who is Assistive Reality?

Assistive Reality is an Australian start-up project created by a team of forward-thinking professionals consisting of Bio and Information-Systems experts with strong experience in AI systems, user interface design, 3D modelling and a driving interest in human-augmentation technology. We believe when you embed sufficiently comprehensive AI into an Augmented Reality software solution, the resulting multiplier effect on human consistency, processing speed, memory and parallelism will improve the human quality of life, allow us to compete with pure-AI systems in the future, and potentially slow down or prevent an outright overtake of human work effort by AI.

By running an Assistive Reality application on your AR/MR headset, you can recognise the incredible potential of AI-integrated Augmented Reality, getting a glimpse into a future long touted as Sci-fi, but rapidly become reality. AR/MR human assistance technologies will improve the lives of professional and home users around the world. As a group, we feel AR and MR hardware is reaching early maturity and the timing is right to launch a dedicated Augmented Reality software company now, with the goal of delivering advanced multi-platform AI-integrated AR & MR software to new devices beyond 2017.

The name **Assistive Reality** is derived from our concept of creating applications that will use intelligent AI systems from a variety of authors, to integrate with device sensors, and cloud-computing to provide assistance to the human wearer in their professional and home life. We aim to push the boundaries of software, hardware and human integration to develop new solutions to problems currently consuming significant human time or effort.

In Quarter 2 of 2018 we will release two Augmented Reality applications via each device's store: **World 1** and **Profession**. These applications will be built on our commercial Spectrum AR engine, natively compiled and customised for each device to obtain maximum performance.

World 1 introduces the concept of an AR World Browser, allowing an always-on AR experience whether at home or in public, with seeded content and integrated AI offering configurable levels of assist. All users that hold **ARX** tokens gain the ability to host AR zones for multi-user interaction.

Profession is intended for light professional usage, and allows the user to select a job role or task function; the AI will observe the environment through 3D positional tracking and offer visual cues and guidance specific to that task. The task database is built up by a learning algorithm that aims to continually improve its success rate.

We're currently in the start-up phase, fine-tuning alpha code on the Microsoft MR and Apple AR SDKs, while working on establishing Google and Apple compatibility in the coming months. Our team have been very active forming foundation partnerships with companies aiming to deploy enterprise-integrated AR/MR or VR solutions, and achieving commercial agreements to create dedicated applications to meet enterprise workflow and social requirements. These partnerships will be announced via our press portal (<https://aronline.io/press-releases>) in future.

Each of our applications uses our in-house commercial [Spectrum](#) AR engine, which provides an API that will later be opened to the general public for development. Spectrum runs in native mode on each support AR/MR device and allows for a number of features to be shared across our applications.

One of the important shared functions is access to the Ethereum Blockchain; to provide for a number of features such as secure storage of biometric ID hashes, data hash storage and replication, AR zone funding/rewards, for purchasing [World 1](#) in-world games or events, and for tracking, recording and delivery of the licenses purchased by users.

Another important shared function is the modular nature of the AI codebase selected for objects, interactions or bots within the AR space. Developers can select and customise a number of open-source AI modules when building applications on the Spectrum platform or creating AR Zones within an application like [World 1](#).

From a commercial standpoint, we have a fully developed business and marketing plan, and intend to approach revenue development from a number of angles. We have strong projections within the corporate AR/MR space as Spectrum provides highly advanced enterprise-integration (Office 365, AWS, Microsoft and Unix stacks), it can be readily adopted to almost any major corporation's workflow, and its highly robust 3D object recognition capabilities enable a variety of usage cases.

We also expect [World 1](#) and other third-party home/public applications to be successful on each device's native app store, since the experience they provide is so transformative for everyday life. We intend to publish our AR zone world format for consumption by other third party applications and developers in future.

Crucial to the project's later financial viability is our enterprise market penetration and home/public user numbers. To this end, all members of our team have strong experience building and nurturing relationships with government, defence and corporate organisations, whilst also being avid consumers of early and advanced technology themselves. We will leverage our wide-ranging contact base and a significant marketing spend across Asia-Pacific and China to gain early trials and secure demand for our AR/MR applications. To improve enterprise integration options we've architected features such as cloud (Office 365, AWS) and local Directory Service integration, OS policy enforcement, Blockchain secured biometrics and building-system/home-bot integration.

Our plans for Augmentation technology are not limited to optical headsets; we are also actively researching and creating software prototypes to implement building-wide AR environments, and creating partnerships within the optics industry, with the goal of deploying code to run on contact lens or implant technology systems as and when they become available.

Individually, we've previously built messaging systems, interactive meeting rooms, smart-mirrors, chat bots, AI systems and object tracking software; by leveraging these skills to ensure we are early to market on a number of a prototype products and by delivering a user experience that is of the highest quality, standardised across hardware platforms, **our aim is to become the industry leader.**

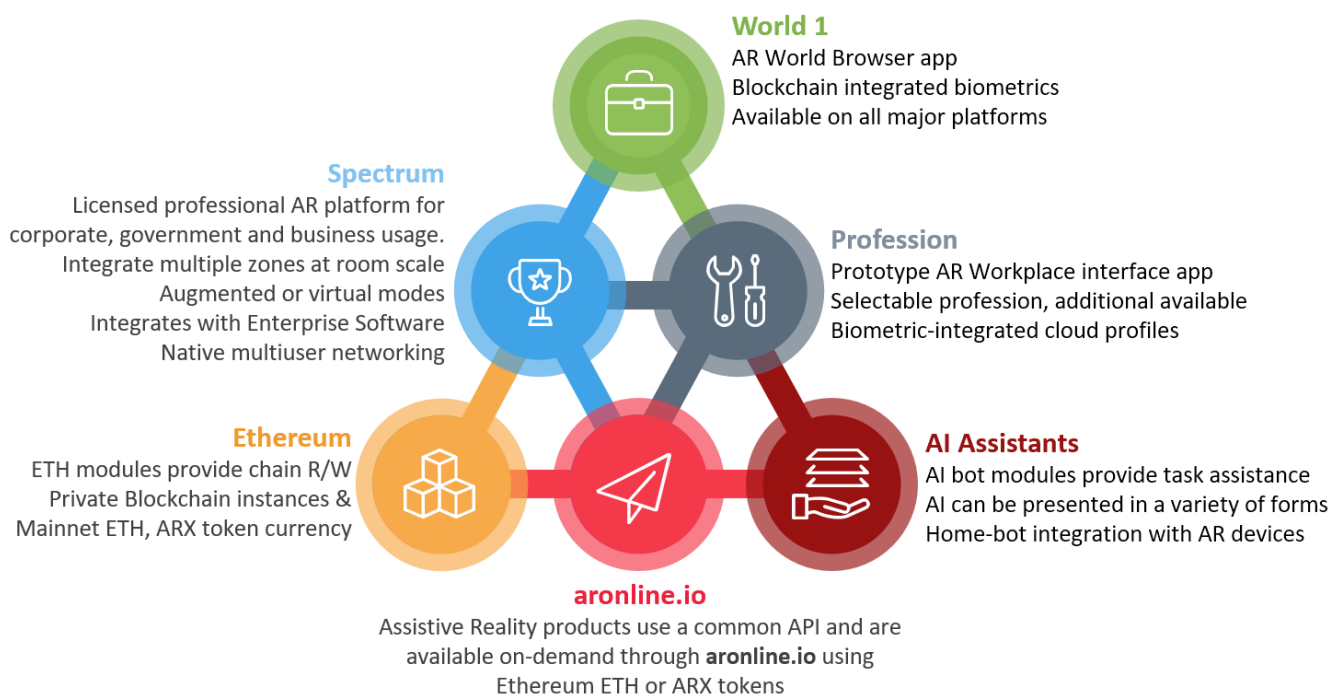
What are the **aims** of the project?

Mission goals

- Champion the integration of Artificial Intelligence software with Augmented Reality devices
- Enable humans to be highly competitive in complex tasks where AI has an inherent advantage
- Act as a catalyst for the adoption of AR/MR/VR technology in business
- Increase commercial awareness and adoption of the Ethereum Blockchain & smart contracts
- Provide an example of ICO fundraising bootstrapping a successful Tier 1 technology firm
- Establish relationships within the contact lens design and production industry

Deployment goals

- Complete development and compatibility testing of our **Spectrum** Augmented Reality engine
- Contract to deploy 15 **Spectrum** application sites within 2018
- Ensure our Spectrum-based **Profession** apps reach top 10 rank/major app stores within 2019
- Ensure our **World 1** world browser reaches top 10 rank/major app stores within 2019



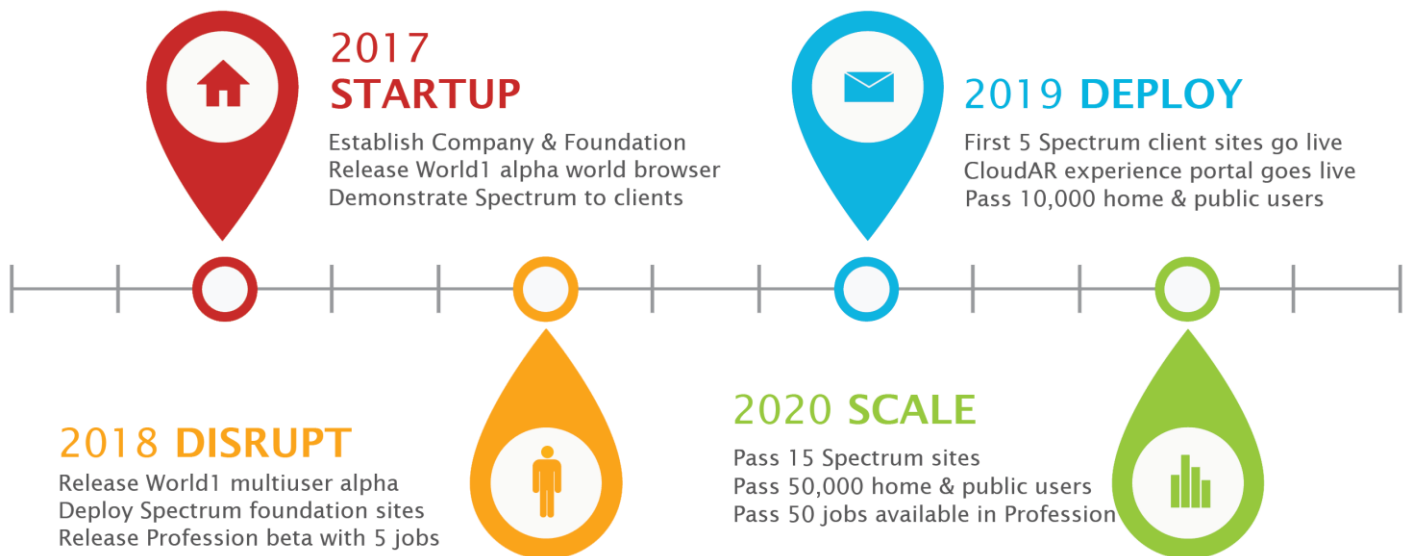
Increased adoption of AR/MR/VR has been delayed awaiting a number of incremental technological improvements; client-device internet bandwidth has required upscaling to enable effective cloud app distribution and real-time high fidelity content streaming; CPU-task offloading is more viable beyond 2017 due to the reduced latency and increased throughput of modern optic fibre, 4G/5G mobile and VDSL consumer networks; Blockchain usability has improved dramatically through Ethereum's use of distributed applications, smart contracts and EVM processing techniques. Optics and sensor technology has taken great strides, with lightweight mounting options available. These progressions in the technology landscape are the underpinning of a revolution in the basic computer/user interface paradigm.

What is the **timeline**?

In the first 24 months we are aiming to establish the Australian division of the company **Assistive Reality** to facilitate research, development, deployment, demonstrations and licensing; we have also committed to a number of foundation site clients and interested parties to deliver the following clear outcomes by our March 2019 “**Deploy**” milestone:

- Perform ICO (**ARX** token), fund company structure, establish development contracts
- Demonstrate **Spectrum** alpha software running with sample tasks at various trade events
- License 5 Foundation Sites for Spectrum deployment trials in early 2018, ramping up to 15
- Release Spectrum beta to foundation sites, monitor and adjust onsite
- Release **World 1** beta World Browser for Google AR, Glass, Microsoft AR/MR and Apple AR
- Perform World 1 closed alpha test of large-scale multiuser networking
- Deploy Ethereum smart contract to public main net for exchanging **ARX** tokens for World 1 access or Spectrum licenses
- Begin advanced AI-in-AR research paper regarding in-world and in-zone automation
- Publish a research paper discussing the future-state of human visual augmentation
- Scale development up to 3 full-time development team members
- Test private Ethereum Blockchain secure-storage smart contract functions

We have segmented and summarised some milestones from the first 4 years of operation into clear **Startup, Disrupt, Deploy** and **Scale** phases, as shown below:



Our initial operational emphasis is twofold; (1) To develop and deploy our **Spectrum** AR engine to major corporations around the world, either standalone or in combination with comprehensive solutions including room-integrated hardware (spatial sensors), audio systems, open AI bots and backend Ethereum Blockchain services, and (2) To develop and distribute **World 1**; the first AR World Browser application to be available simultaneously on all major platforms to allow home users to explore the real world through a dynamic visual interface, with a range of advanced functionality. It is also expected **World 1** will allow the user to discover applications, live content and participate in AR World zone activities made available through social media or web pages/stores.

Why is [Ethereum](#) integration important?

Ethereum is a leading cryptocurrency in 2017 and has many advanced features including Turing-complete smart contract scripting and sandboxed code execution. Ethereum's EVM programmability has contributed to the rise of many distributed applications and offers unique integration options for AR/MR applications. Building our software with native support for Ethereum technology provides the following benefits for our users:

- Private or Public Blockchain-secured Biometrics for each user provide security, audit trail, and data survivability with integrity beyond a typical private database
- Swarm technology is leveraged for roaming user data and some profile information
- Smart contracts are executed using distributed computing (nodes) allowing a degree of processing-offload for miniaturised devices
- Ethereum configurations are already available within major cloud provider services, giving immediate, well-understood scaling when storing data for enterprise client solutions
- Ethereum has a strong development roadmap and community, with good leadership, which has led to widespread trust and adoption across a range of platforms, by a variety of internationally-respected companies; integrating with Ethereum allows us to work with a proven community of professionals with established toolsets and practices, increasing consistency and standardisation

Users of our [World 1](#) world browser will utilise Ethereum integration to interact with paid content in the same way a credit card enables in-app purchases for a traditional Store. We are currently experimenting with coding techniques to use the Ethereum Blockchain itself to track the state of individual AR Zones with various lazy-write cache mechanisms. Direct interaction with Ethereum smart contracts is high on our development priority list for [World 1](#) and [Spectrum](#), with complete Ethereum Blockchain integration (inbuilt wallet for each headset user profile, gesture and basic biometric private key support) coming before the March 2019 release milestone. The array of possible usage cases for Blockchain-integrated AR applications is limited only by imagination; one example is a Doctor entering a hospital room to examine a patient in a modern AR-equipped hospital. As the Doctor enters the patient is automatically identified by sensors on the Doctor's optical device and a patient retrieval smart contract is called to obtain the details of their current stay. The smart contract examines the list of approved requestors for this patient ID on a Blockchain to locate the key provided by the Doctor's device to allow the retrieval of medical history. The current chart/info for the patient may be sourced from an existing Enterprise health care management product; seamlessly retrieved in the background and presented to the doctor as an eyes-up information stream.

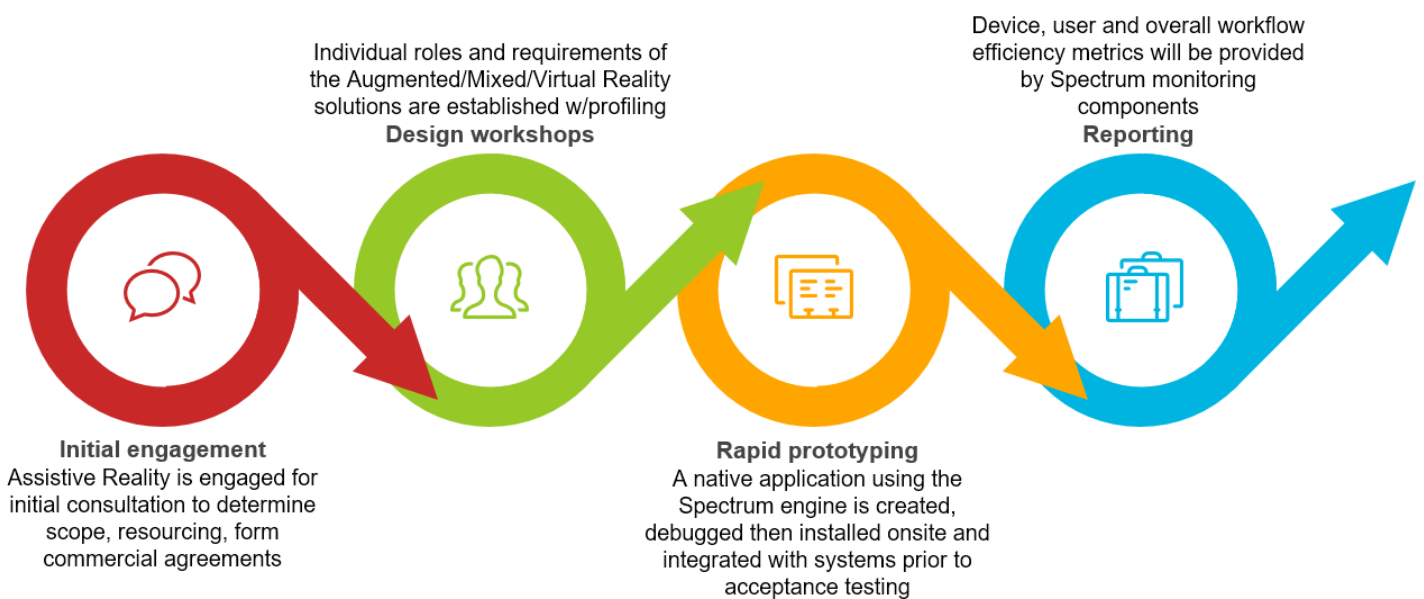
- [ARX](#) tokens issued in our ICO can be exchanged using the redemption smart contract for [World 1](#) and [Profession](#) early access
- [ARX](#) tokens and ETH can be used to interact with paid content in all Assistive Reality consumer-facing applications, including AR zones that contain premium content
- Ethereum's developer community will be directly leveraged to hire coders and testers for smart contracts and Blockchain integration when building World Zones and assistive AI Bots
- As an early developer and integrator, Assistive Reality aims to gain significant market share within Government, Defence and Corporate organisations, exposing them to Ethereum technology potentially for the first time, expanding the reach of Ethereum in general

What is our vision for **professional** users?

We envisage professional usage of Augmented Reality to occur at a large scale; car production factories, construction projects, law enforcement, education and health care are all examples of sectors that can benefit enormously from intelligent augmentation software solutions.

For professional users, we provide two options during 2018/2019;

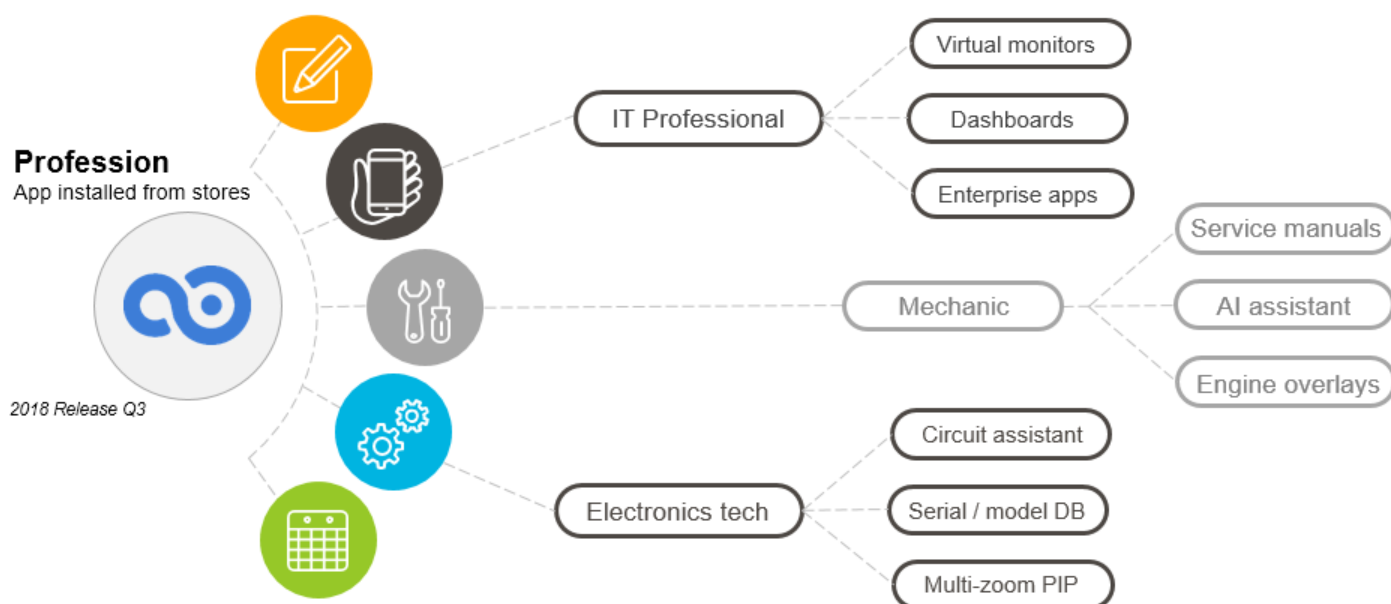
1. Engage with us to plan a custom-built application/suite based on our bespoke **Spectrum** platform with onsite hardware integration, AR/MR zones, room-scale VR facilities, Ethereum Blockchain integration. This option is recommended for larger companies who have significant facilities or high staff numbers. The following diagram shows the engagement process for a partner company who desires a customised commercial-grade Augmented Reality/Mixed Reality solution:



2. Purchase the **Profession** application from the app store on your device; this is our prebuilt user-customisable application. **Profession** is recommended for smaller companies or other users that may be performing a work activity and is available with alternative UIs and a selectable list of professions.

Profession features include:

- Switchable user interface (for different job roles, or preferences)
- Professions to select will be added regularly
- Surface-to-screen projection
- AI-bot or Virtual Assistant
- Fine-tuned UI/UX for each profession type
- Guided Action with prompting
- Real-time Communications
- App integration
- Blockchain Recording and Archiving
- Room and Dimensional-space scaling



Example of features for different professions

Innovative software implementation of these features can revolutionise day to day activities in a vast number of companies. It is important to note the Profession application and its interfaces/plugin are running on a consumer version of our [Spectrum](#) engine. [Spectrum](#) is a bespoke Augmented and Mixed reality application engine developed from the ground-up **on each major platform** (Google AR, Apple AR, and Microsoft AR/MR) to provide significant professional-focused advantages over traditional SDK developed applications. The beta release of [Profession](#) is targeting the following high level AR feature support on Google, Apple and Microsoft devices, with some variance based on final specifications and individual model capabilities:

Metric	Available	Type
Max. capture distance / marker	Yes / Variable	4.5m / 5.5m
Minimum angle reconciliation	Yes / Variable	35-40 degrees
Full-time multi-level AI assist	Yes	Native
3D Recognition w/stability hold	Yes	Native & Cloud
Geolocation	Yes	Native
SLAM-based tracking	Yes	Native
Biometric security	Yes	Native & Ethereum Blockchain
Directory integration	Yes	Microsoft & Cloud
Cooperative multiuser	Yes	Native
Large/data storage	Yes	Cloud & Ethereum Blockchain
CPU offload	Yes (Optional)	Cloud
Blockchain currency integrated	Yes	Ethereum ETH & ARX tokens
Blockchain applications	Yes	Ethereum smart contracts Distributed apps coming late 2018
Multiplatform	Yes	Native
Developer API and Store	2019	Scheduled for 2019

Throughout 2018 Assistive Reality will be performing onsite deployments of [Spectrum](#)-powered custom applications with Government, Defence and Corporate clients in Australia to generate demand and secure licensing contracts for 2019. Each implementation will utilise a [Spectrum](#)-based AR/MR/VR solution using the 2018 beta interface, AR zones, backend Ethereum Blockchain storage and include onsite training. [Spectrum](#)-based applications feature a consistent look, feel and set of user input conventions to ensure there is minimal retraining requirements when staff move between roles within a company. Deployment to our foundation clients will provide us with real-world deployment feedback, engineering and development partnerships, and allow us to fine-tune user input and fatigue-management techniques.

What is our vision for [home](#) users?

For home users we are releasing our flagship multiplatform application for AR/MR devices called [World 1](#). World 1 is the first multiplatform use-anywhere AR/MR World browser. Our vision of the world browser is that it is a passive user interface for the Augmented Reality wearer, to provide unobtrusive assistance for anything and everything; detecting objects in the real world and using cloud-CPU processing to match object motion with real-world task assistance profiles, presenting content designed to assist the wearer, such as the provision of passive metrics like distance-to, depth, colour values, or even real-time facial emotion analysis. A real-time HUD for the real world. There are many possibilities for the future usage cases of World 1 such as dedicated task zones based on physical location, networked task coordination and gaming for groups of people, visualisation of building or landscaping plans, 3-dimensional virtual object sharing, etc. Once Augmented Reality devices are sufficiently unobtrusive and socially acceptable, this technology is expected to be significantly transformative.

High on our development priority list is ensuring [World 1](#) is fully compliant with all upcoming standards for accessing content in AR and VR Worlds. After installing the [World 1](#) application from the device's native app store, a user can activate their AR/MR device and utilise the dynamic nature of the browser interface and real-time cloud-based sensor analytics to navigate the real world while remaining open to augmented content. For Augmented or Mixed Reality devices, it's easy to imagine a world where you can walk around your home using voice or gesture commands to assign a virtual screen to a blank wall of your kitchen, showing a HTML page with a recipe while you cook. A recipe application executed by [World 1](#) can use the device's native sensors to observe the ingredients as the wearer makes the meal, and use Guided Action prompting to guide the wearer through the process. Outside the home, walking to a nearby bus station grants the wearer the benefits of live 3-dimensional object recognition highlighting points of interest along the way; the bus station distance and time remaining to walk, with a transparent-hover to launch the native Android or iOS bus timetable application in-place, giving non-intrusive information to the wearer with low data and processing requirements. Individual apps can be rendered to floating bubbles or other virtual screens. Any surface in the real world of sufficient dimensions and reflective properties can be marked as a desktop workspace or virtual screen to which a variety of cloud or local sources can be connected. Assistive Reality will work with the Ethereum community to encourage the development of Blockchain-based applications for the Augmented/Mixed and Virtual Reality modes of [World 1](#).

What **problem** does this project solve?

Augmented and Mixed Reality environments represent an important juncture for computing system interface design; this project aims to solve many basic problems with AR/MR/VR technology adoption in the home and Enterprise, including:

- **Problem:** AI is capable of outperforming humans in various tasks (such as demonstrated in complex challenges: Deep Blue Chess, alphaGo, openAI). This extends to the future workplace and possible future of the robotics industry.
Our solution (or rather, our roadmap to the solution): Augment the Human experience using technology and AI software. Typecast the AI as a human assistant and code its moral and ethical values as such. Build high speed cognitive interfaces to combine the dynamic nature of the human brain and thought process with the hardware performance available to an AI software assistant. It is expected through eventual maturity and adoption of this technology model humanity could experience a multiplier effect on: productivity, complexity-handling, memory, task-repetition reliability and processing speed.
- **Problem:** Workplace Implementation of possible AR/MR/VR technology assistance is not performed due to a lack of internal resourcing specifically for these technologies; companies usually do not have available internal personnel with skills and time to develop advanced workplace AR applications, zones and experiences or to adjust workflow to best leverage new AR/MR/VR technologies; nor to evaluate an entire developing market to keep track of hardware updates as required for making the best-informed decisions.
Our solution: We have developed the [Spectrum](#) engine alongside a consulting and implementation framework that ensures we can transform large or small companies with advanced Augmented Reality technologies including applications, hardware sensors, building automation, workflow mapping and application connectivity. Assistive Reality team members will attend all rollouts of [Spectrum](#) custom applications. [Spectrum](#) is a bespoke engine to power Virtual, Augmented and Mixed Reality applications for enterprise and industrial environments. [Spectrum](#) is designed to provide a fluid, feature and content-rich, industry-leading AR/MR/VR experience within each client environment. Using advanced technology such as integrated AI assistance, a Blockchain-based biometric hash identification system, cloud CPU-processing, directory service integration and multi-user networking, [Spectrum](#) can provide today's workplaces with significant productivity gains.
- **Problem:** Cross-platform user interface standards are not clearly identified (or do not exist at all in some cases) and the user experience can vary significantly between devices, and between applications on the same device.
Our solution: Both [World 1](#) and [Spectrum](#) are built using native code on each major platform, and feature a high performance API layer and standardised user interface conventions. Our API layer is intended to allow rapid porting of applications either between devices or to new iterations of a device. We are ensuring a great degree of effort is put in to ensure (to the largest extent possible) shared codebases.

- **Problem:** Integration with Enterprise environments (Microsoft Office 365, Microsoft Active Directory, Amazon Web Services, Azure hosting) is low to non-existent

Our solution: [Spectrum](#) features enterprise grade directory service integration with Microsoft Active Directory, Microsoft Office 365, AWS Directory Services and Azure AD hosting. Advanced integration with various Enterprise applications such as Exchange and Skype for Business is also available on Microsoft AR/MR/VR headsets.
- **Problem:** AR/MR/VR versions of applications often take the form of vendor-provided 3D AR/MR/VR extensions, and recommend their users view 3D AR/MR/VR content through a 2D smartphone screen, proprietary device or dedicated viewer application.

Our solution: [World 1](#) and [Spectrum](#) are built from the ground up to be fully immersive Virtual, Augmented or Mixed Reality applications in an enabled 3D/4D world space, utilising a combination of each native SDK, the shared platform codebase of [Spectrum](#) and custom application plugins or frameworks to create the experience for client workplaces.
- **Problem:** Back end storage options for VR, AR or MR applications on some platforms do not exist; on others they are limited to either slow-local or small-remote storage.

Our solution: Our combination of tiered data centre storage and encrypted on-Blockchain options gives [World 1](#) and [Spectrum](#) a significant advantage in speed and capacity compared to direct AR/VR competitors. We take a similar approach to others in storing hash values on the public chain using a secure encryption and then store actual data in a zero cost back-end tier system comprised of Ethereum Blockchain, and Microsoft SQL (for some high availability functions)
- **Problem:** There are social concerns about wearers of AR devices in public such as Google Glass using the integration and high fidelity cameras to retrieve personal information about others.

Our solution: One early concept we have is called [BlockAR](#), consisting of a mobile app available on all platforms, which activates a Bluetooth beacon or hidden wireless SSID on the device our standards-compliant AR applications can detect and automatically disable features that may violate privacy (there are known issues with this implementation strategy). A second concept is a physical tag on a piece of clothing that contains a marking detectable by the wearer's optics, which renders the wearer immune to facial recognition and other biometric comparisons. A third option could be cloud-based immunity; we believe it is likely a combination of these strategies and a new unknown strategy may also be employed in the near future.

- **Problem:** There aren't many professional, enterprise workplace applications making good use of AR/MR/VR yet and many companies are beginning to form AR/MR or VR strategies now without partners or enterprise products to give them the ability to meet their requirements

Our solution: We will be pushing very hard to drive AR/MR/VR into workplace and industry through a large number of efforts including the AR/MR/VR workplace experience demonstration room to be created in an office space in Brisbane CBD, to allow investors and prospective clients to come to examine highly advanced implementations of AI-driven business utilising AR/MR or VR augmentation

Who are our competitors?

The most likely competitors are future disruptors or current-unknowns, however we have also conducted an extensive analysis to identify pre-existing competitors. The current market for Augmented and Mixed reality is limited, with competition mainly of the following type:

- Game developers who are producing Unity or Unreal-based content
- IT companies who identify AR/VR/MR as a technology vertical to sell or integrate
- Consulting firms who have added AR/VR/MR to their range of services for consulting
- End-user experience builder software for non-integrated/home usage
- Assorted niche role companies within the software space
- Technology demonstrators and start-up companies
- VR-for-business companies less focused on AR/MR, less 3D engine experience
- Other limited-focus AR companies (individual features, individual functions)
- Blockchain virtual world projects (though we have significant competitive advantages over presently funded projects)

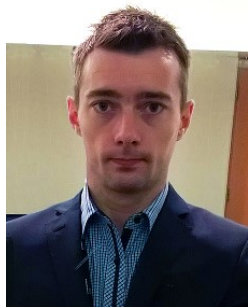
At the time of writing Virtual Reality software has the most penetration in the market and the most mature hardware devices, however the Augmented and Mixed reality industry is widely predicted to be the largest in future. While we are an Augmented Reality focused company, we see the increasing maturity of Virtual Reality as creating a probable first entry point to the world of immersive reality technology for many companies and individuals; our [Spectrum](#) engine and applications therefore contain native VR compatibility and dedicated VR interface modes to ensure we can maximise the rate of adoption of all modes of reality augmentation.

[Assistive Reality](#) differentiates itself from competitors through many factors:

- [World 1](#) is the first general purpose use-anywhere AR World Browser software that can run on multiple platforms with an online networked experience
- Our Bespoke [Spectrum](#) augmentation engine provides performance advantages over high-level AR experience creation tools, and eases integration with enterprise environments such as Office 365, Active Directory, AWS, SCADA, FB, Teams, Slack and Yammer, amongst others.
- Multi-engine, Multi-platform; Spectrum features the ability to leverage Unity, Unreal, C#, ARKit or ARCore for various functions on different platforms.
- [Profession](#) will be the first application to feature multiple-profession, guided-action workplace assistance for the general public using AR/MR/VR
- Use of Ethereum and ARX tokens as currency
- Blockchain integration for storage of visual, audio or text data storage directly from the AR,MR or VR browser/application
- Private Ethereum Blockchain for AR/MR/VR content storage, company data, sensitive information, audio/video capture, geo-positional tracks
- Our team is highly experienced in many complex Enterprise environments and are understanding of the challenges faced by corporate, government and defence professionals

Who are our **team members**?

Our founding group is below; we have also created a hiring strategy to bring other biotech and development expertise on-board after the ICO completes.



Travis Roe <https://www.linkedin.com/in/travisroe/>

CEO & Product Architecture Leader

Travis has a rich background in software development and start-ups, working first as a 32bit web browser developer in the 90's followed by being involved in web metrics venture capital start-up Maxamine (acquired by Accenture '08). Travis embarked on a Microsoft developer and enterprise infrastructure career working for enterprise clients around Australia, before starting his own company *AusPortal*. Later working for Hewlett-Packard and DXC Technology in a technical leadership role, Travis has a wide array of management and C-level contacts in a number of industries throughout Singapore, Hong Kong, Australia, Philippines and New Zealand.

Throughout 2016/17 Travis has spent significant time developing Visual Search engines, AI chat bots, Ethereum smart contracts, and Augmented Reality interfaces. Travis is an Ethereum advocate and a believer in the future of AR technology; his programming skills include Cocoa, ARKit, SceneKit, C#, C++, Solidity, Java & Assembly.



Craig Straw <https://www.linkedin.com/in/craig-straw-0b567817/>

Marketing & Strategy Leader

Craig has significant experience in corporate channel and sales/marketing strategy with a proven track record of revenue development and C-level relationship management. Having been exposed to technology at young age and with experience building a start-up energy company, Craig brings a lot of contacts and years of experience in scaling companies to Assistive Reality. He has strong experience with multimillion dollar accounts in industries such as Energy and Mining, Healthcare, Construction and Technology and can leverage the contacts developed throughout

his already-substantial professional career. Craig has worked on a number of software projects in the past offering development input, product refinement and ensuring features are aligned to market demand. Craig is also a father of 2, an avid HTC Vive VR user and enjoys simulations such as rFactor2.



Qingqing Wang <https://www.linkedin.com/in/vicky-qingqing-wang-22963672/>

Research Leader - Human Augmentation, Lens Integration

Holder of a PhD degree in biology, Qingqing has a strong background in biology research. While studying in one of the best universities in China, Qingqing explored areas of particular interest in neuroscience and further enhanced her knowledge in the study of vertigo from motion as a member of the Neuroscience Group 2007. Qingqing maintains connections to multiple experts in the brain and neuroscience field, and is particularly interested in the application of AR for treatment of certain neurological disorders. Qingqing is currently examining the cognitive effect

of AR, MR and other blended reality interfaces, and the health impact of AR headset and lens usage. Qingqing has a wide array of contacts throughout the biomedical industry and can provide assistance in accessing the China market for our applications and company.



Mark Palmer <https://www.linkedin.com/in/markspalmer/>

Technology & Concepts Leader

Mark is a senior developer and infrastructure architect who has excellent communication skills with all levels of business and possesses a tremendous ability to translate technical requirements into a simple solution. Mark combines Microsoft and AWS ecosystem skills with strong international business experience and is able to deliver high quality project results while

maintaining a hands-on approach to daily issues in code or design. Mark has a strong interest in workplace and sporting applications of AR; having a significant background in large-scale technology projects Mark is an invaluable contributor to our project. Mark has a track record of projects delivered successfully against tight deadlines in complex situations, and will bring a significant skillset to bear in deploying AR/MR/VR technology.

How do I get early access?

Early Access applicants must register their interest and select the device they are using for AR/MR or VR. Early Access users will be required to sign a relevant NDA and return it to Assistive Reality prior to being provided with a key to download software.

Early access information registration is available at <https://aronline.io/early-access>

Requests for information can be sent to staff@aronline.io

In future aronline.io will feature an access portal with the following features:

- Links to register and sign an NDA online, submitting ID
- Funder download options available via the [ARX](#) token redemption smart contract
- Non-funder limited download links for early builds of our software
- Software streaming capability for devices with no/low local storage
- Forum for troubleshooting with early adopters
- Details of AR Zones near you
- Ability to host an AR or VR Zone

What technology does Assistive Reality use?

Our [Spectrum](#) engine powers all Assistive Reality applications and is written in a number of core stacks simultaneously to ensure we have a common API available for use by higher level components wherever possible. We specifically utilise a combination of native device SDKs (ARKit, ARCore), OS API (for Android), C#/.Net, and 3D Engine scripting within Unity3D and Unreal Engine. For certain implementation types we have found Augment and Vuforia to offer elements we can integrate with [Spectrum](#) for a deeper experience. We support platforms across the industry such as SteamVR, Apple Store and Google Play for deploying our applications. In the future we hope to publish our [Spectrum](#) engine API and allow developers to create Enterprise AR applications for licensing by our corporate and government clients.



We will initially provide support for the following hardware devices:

AR/MR

- Microsoft HoloLens and other MR SDK devices
- Apple AR-kit based devices
- Google ARCore
- Google Tango and/or Glass native

VR

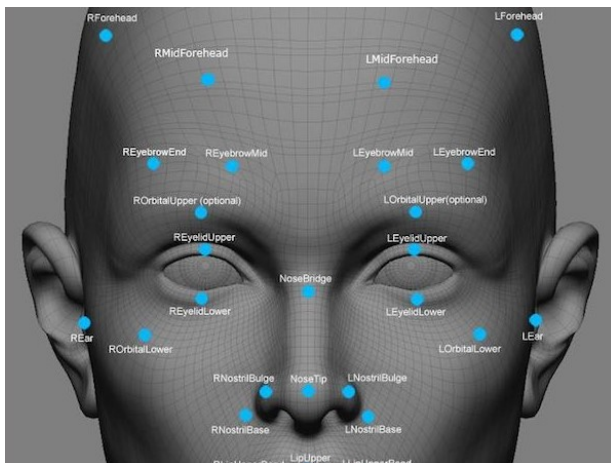
- HTC Vive
- Oculus Rift
- GearVR

We intended to provide future support for the following devices, pending the establishment of a commercial agreement and our technology compatibility assessment:

- Magic Leap
- Google Home integrated home-projection
- Smart contact lenses (As soon as available)
- OpenAI projects (via visualisation plug-ins)
- Android-based AR Bluetooth connected devices (such as Epson's Moverio)

Our **technology roadmap** includes some of the following items

- Examination of whether integrated AR can ever provide information sources for Ethereum Blockchain oracle services (for example, multiple outdoor AR wearers in San Francisco measure the ambient temperature and light intensity, cloud cover while performing normal activities, this information could be used to form a consensus)
- Development of other forms of human augmentation, such as skin-sensors or an ability to perform neural interfacing, in the pursuit of human-assistance
- Field-of-vision 3-dimensional full-scene analysis. Our current development in this area has been challenging but we've made outstanding progress. Our facial recognition software already has a very high successful detection rate



- Establishment of a virtual and physical AR Zone for demonstrations for corporate clients
- Interoperability with future Facebook and Google AR zone and world standards
- Prevention of the 'overtake' of humans by AI; or at least prolonging of this effect. Augmentation of human work effort by custom cloud-driven AI and automation via smart contract will allow human minds to focus on more creative or important tasks. Augmentation will provide a multiplier effect and allow humans to remain effective compared to standalone AI for a significant time into the future.

How are we funded?

Assistive Reality will be funded by two sources: private investment from the founders group and an ICO for the **ARX** token on the Ethereum Blockchain from September 29th 2017 until October 20th 2017, or until the cap is reached. In order to conduct an ethical, responsible fundraising activity, we are observing the following conventions:

- Security and functional reviews conducted on Crowdsale contract
- Solidity best practice guidelines for ordering smart contract code
- All funds fully refundable if Crowdsale is unsuccessful
- Source code for contract published on GitHub (<https://github.com/AssistiveReality>)
- Capped Crowdsale with minimum and maximum caps
- SafeMath integer overflow functions used throughout
- Multi-sig wallets for funding and foundation
- Trezor hardware wallet for cold storage
- Company name purchased locally
- Business plan, banking services and funding from founders established

We are very driven to build a successful technology company and to bring Ethereum Blockchain technology to an even wider community. We also believe by establishing a high performance start-up a significant improvement in the credibility of future ICOs can be achieved.

The conditions of the Crowdsale itself are shown below, as enforced by the smart contract. Whomever sends Ether to this contract directly, or via the BuyTokens function, is considered a 'participant' in the Crowdsale.

The Pre-sale and ICO contracts sell the same ARX token. The ICO contract is first deployed, which awaits its start block to run the ICO but immediately dispenses the Pre-sale tokens to the founder wallet. We then transfer the Pre-sale tokens to a separate, Pre-sale contract.

Assistive Reality contracts:

- Implement a standard ERC20-compliant token **ARX**
- Are limited; only Pre-sale ARX tokens exist before the ICO, and no additional ARX tokens beyond those created in the ICO itself can ever be created.
- Utilise Multi-Signature wallets for processing and hardware wallet cold-storage for ETH
- Supply the Assistive Reality foundation multisig wallet an additional 10% of all **ARX** tokens, to reimburse future developers. This is achieved by adding 10% ARX tokens to the overall supply as the ICO ends, and sending this to the Foundation multisig wallet.
- Allow refunds for ICO purchase simply by calling the Refund function of the ICO contract from the account you submitted ETH from, if the ICO period elapses without reaching the minimum funding level.
- Allows verification of the total token supply
- Allows an emergency halt to occur should any part of the ICO or Blockchain require it
- Complies with the latest compiler version and deprecated Throw recommendations
- Is fully regression tested, security audited and peer/crowd-reviewed with bug bounties

Pre-sale and ICO instructions

The following schedule will be followed for Assistive Reality's **ARX** token Pre-sale and subsequent Initial Coin Offering (ICO). The price of ARX tokens will be on a sliding scale based on how early they are purchased:

Date and Time (GMT)	Event	ARX token Price
Presale		
29 September 2017 19:00:00	Pre-sale opens!	8,000 ARX per 1 ETH
30 October 2017 19:00:00	Pre-sale price update	7,250 ARX per 1 ETH
02 October 2017 19:00:00	Pre-sale price update	6,750 ARX per 1 ETH
04 October 2017 19:00:00	Pre-sale price update	6,250 ARX per 1 ETH
06 October 2017 19:00:00	Pre-sale closes 19:00 GMT	

A number of wallets support ERC20 tokens (with more being added monthly) and therefore support our **ARX** token, such as:

MyEtherWallet (**no download needed**) <https://www.myetherwallet.com/>

MetaMask (Firefox and Chrome browser add-on) <https://metamask.io/>

Mist (Desktop) <https://github.com/ethereum/mist/releases>

Parity (Desktop) <https://ethcore.io/parity.html>

imToken (iPhone) <https://itunes.apple.com/us/app/imtoken/id1153230571?ls=1&mt=8>

imToken (Android) <https://token.im/>

We have enabled IMToken to see the ARX Token natively, no need to 'watch token' with that. You can just send ETH to the presale contract address and it will all work automatically.

Contact us at staff@aronline.io for more information about a specific wallet or query. It is important to consider that potential network congestion can cause temporarily higher fee requirements for the transactions. Our Pre-sale and ICO contracts are fully tested with Mist which successfully predicts the correct gas values, however we also include some comment around the gas values you may need to provide for successful operation of our Pre-sale and ICO contracts.

The screenshots and instructions below will guide you through a few methods of participating in the Pre-sale, including configuring your Mist browser to 'watch' the Assistive Reality **ARX** token, and to send an **Ether** donation to the Pre-sale or ICO contract. The ARX tokens should be retained in your personal wallet until such time as you redeem them using our redemption smart contracts for aronline.io services or apps, or trade them on digital currency exchanges.

Participating in the Pre-sale:

The Pre-sale contract parameters, **address** and **JSON** interface definition are below:

Pre-sale ARX token offering on <u>Ethereum public blockchain</u>	
ICO Token, Symbol, Name	ARX, ARX , Assistive Reality
ICO Contract Address on Mainnet	<u>0x4Ee1d7720a04072142B2efC9d2C7d5d77Ad63939</u> - Etherscan link GAS NEEDED: 98,000
Start date/time (approx.)	<u>30 September '17, 01:00am GMT</u>
Start block	<u>4323576</u>
End date/time (approx.)	<u>07 October '17 01:00am GMT</u>
End block	<u>4348776</u>
Duration	25,200 blocks (approximately 8 days at new block rate)
Pre-sale Maximum (cap)	1,000 ETH
Type of sale	Static Selling token: Assistive Reality ARX tokens Address of token to watch: <u>0xb0D926c1BC3d78064F3e1075D5bD9A24F35Ae6C5</u>
Price	Floating based on current date (see below for more info) 29-30 Sep: 1 ETH buys 8,000 ARX tokens (Day 1 bonus) 30-02 Oct: 1 ETH buys 7,250 ARX tokens (Day 2 & 3) 02-04 Oct: 1 ETH buys 6,750 ARX tokens (Day 4 & 5) 04-06 Oct: 1 ETH buys 6,250 ARX tokens (Day 6 & 7)
Security Reviewed	Yes (numerous)
Source code	https://github.com/assistivereality
JSON definition	TBC
Information URL	https://aronline.io/arx-ico-pre-sale-information/

Price configuration:

Limited Pre-sale cap: **1,000 ETH**

30-01 Sep: 1 ETH buys 8,000 ARX tokens (Day 1 bonus)

01-03 Oct: 1 ETH buys 7,250 ARX tokens (Day 2 & 3) + 10% ARX bonus

03-05 Oct: 1 ETH buys 6,750 ARX tokens (Day 4 & 5) + 5% ARX bonus

05-07 Oct: 1 ETH buys 6,250 ARX tokens (Day 6 & 7) + 5% ARX bonus

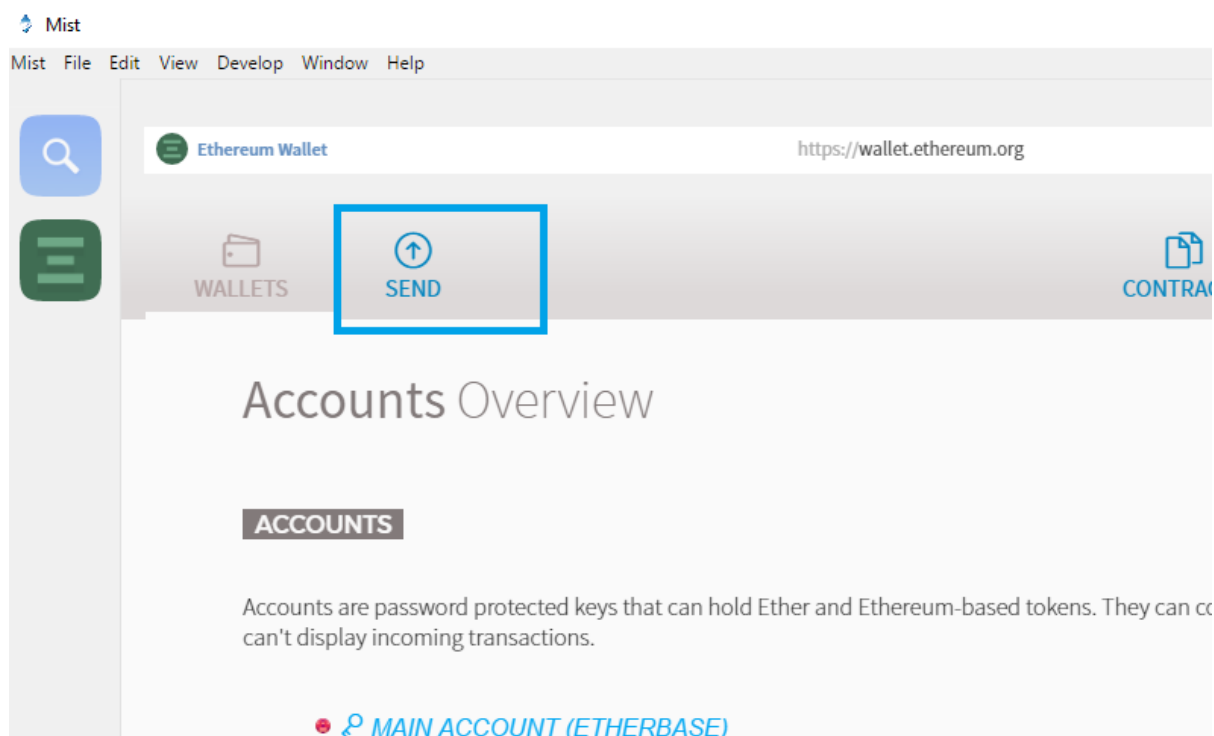
More instructions are here:

<https://aronline.io/arx-ico-pre-sale-information/>

Mist instructions – buy some ARX tokens

NOTE: Mist can take a very long time to synchronise. If you have issues, use Parity or IM.Token. This guide also assumes you have also followed part 1 (to 'watch' the ARX token address)

1. Open Mist
2. Ensure you have followed Part 1 document "1. ARXToken-WatchInstructions.docx" to be watching the ARX Token address
3. Click the Send Button:




4. Paste the Presale contract address into the To field

0x4Ee1d7720a04072142B2efC9d2C7d5d77Ad63939


5. Input your desired amount of ETH to exchange for ARX. It is expected to use **98,000 gas** minimum depending on whether you purchased previously. Both Mist and Parity work OK by default (and IM.Token) however if you have any issue, try increasing the provided gas amount with the transaction. If you use the 'Watch Contract' and ABI method to execute 'BuyTokens' function, you should provide **125,000 gas** minimum.
6. Once configured like this, submit the transaction with your password:

Send funds

FROM


Main account (Etherebase) - 0.50 ETHER


TO


0x4Ee1d7720a04072142B2efC9d2C7d5d77A

AMOUNT

☐ Send everything

You want to send **20 ETHER**.

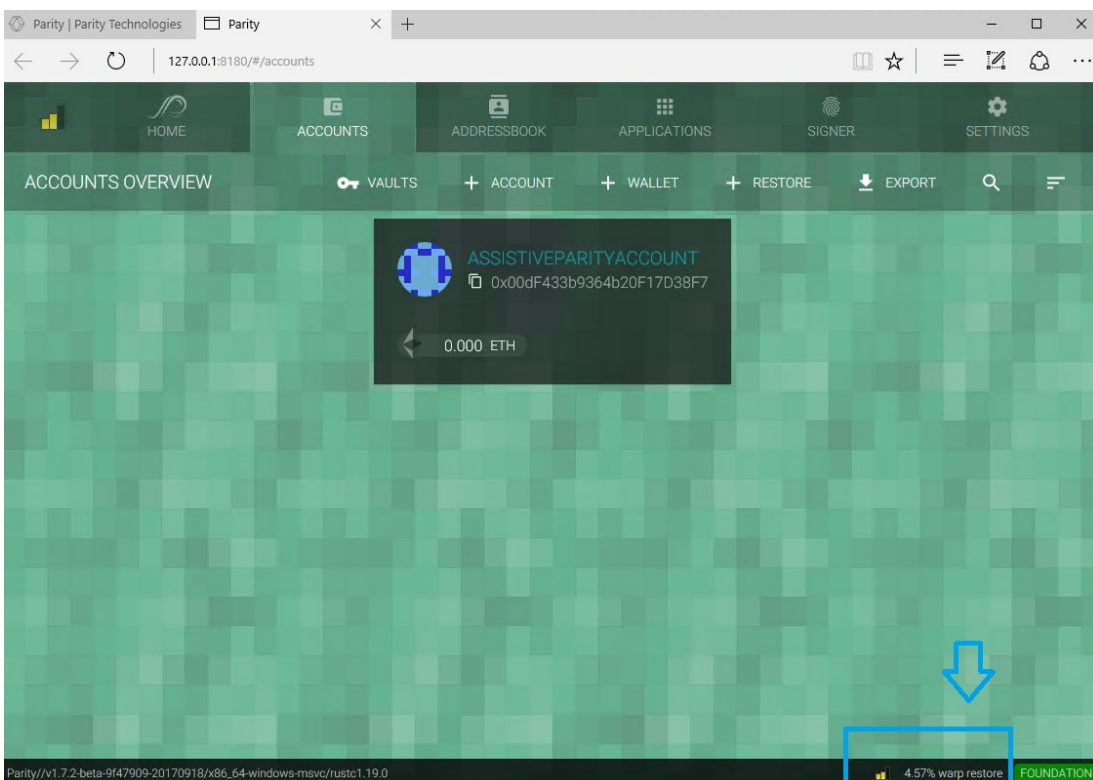
 ETHER

0.496334368793578392 ETHER

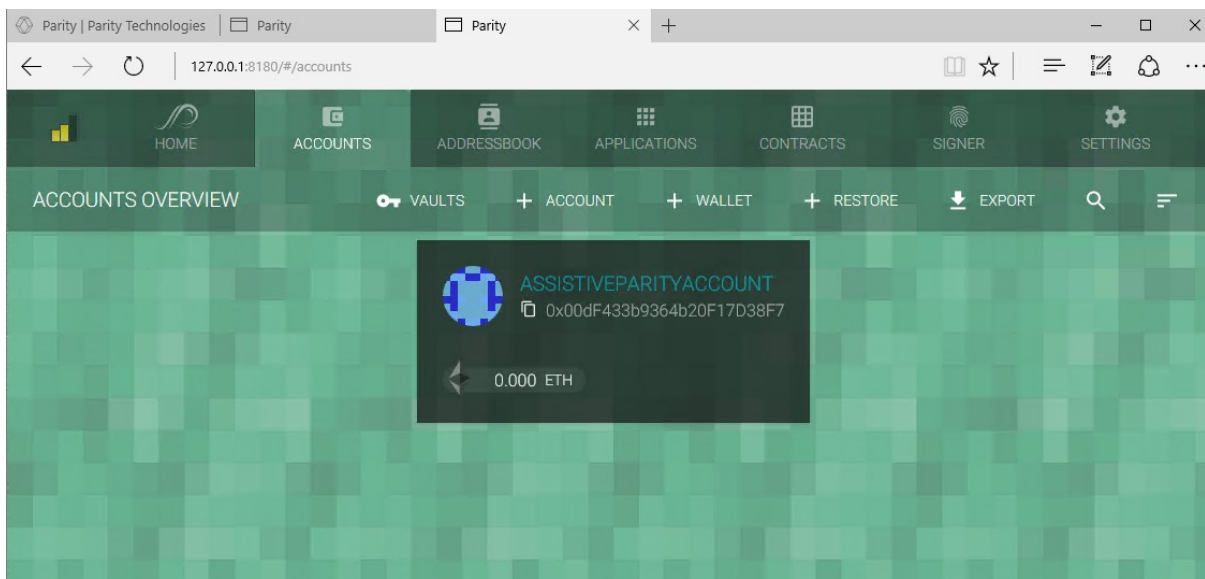
- You will then receive your tokens straight away in a return transaction (normal transaction times apply). Ensure you backup your wallet and store important / valuable tokens or keys in a safe location.

Parity instructions – buy some ARX tokens

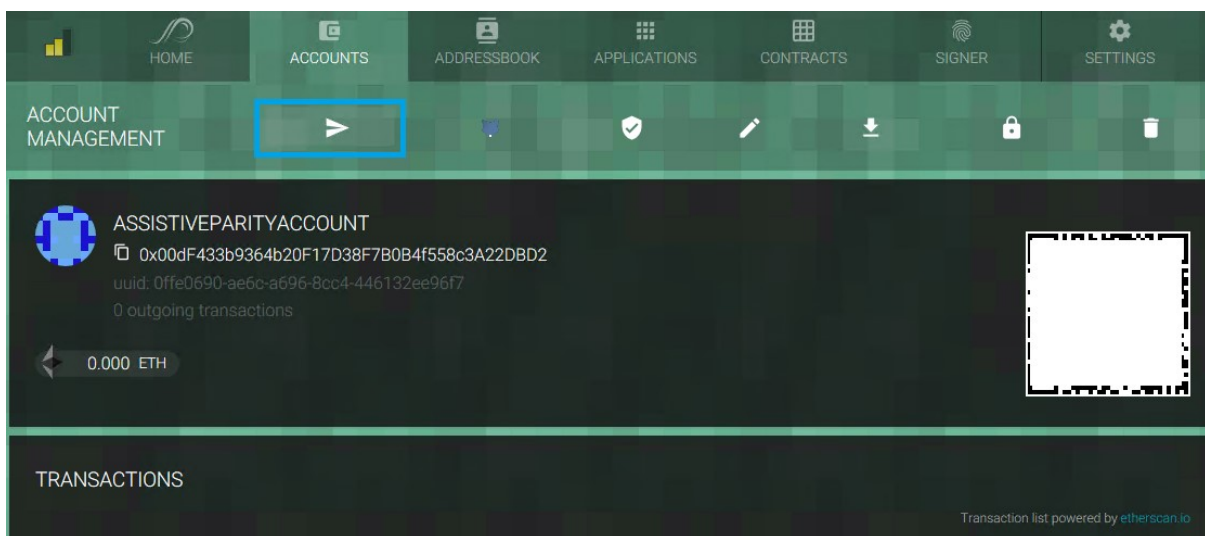
- Open Parity client on desktop, and ensure you have reached 100% warp restore before you actually transfer any tokens:



2. Click Accounts, then select your account with ETH in it



3. Click Accounts, then select your account with ETH in it, then click the Send Icon:



4. Enter the address of the Pre-sale contract, choose advanced options, then choose next

[0x4Ee1d7720a04072142B2efC9d2C7d5d77Ad63939](#)

TRANSFER DETAILS


1

transfer details

2


extra information

type of token transfer

Ethereum

0.000 ETH

recipient address

0x4Ee1d7720a04072142B2efC9d2C7d5d77Ad63939

amount to transfer (in ETH)

50

☐ full account balance

total transaction amount

0.0 ETH

☒ advanced sending options

×

CANCEL

→

NEXT

(It's suggested to use a slightly higher gas value but should not be required with the newer versions of Mist or Parity. Use **98,000 Gas**. If any issue occurs set it up to **125,000 Gas**.)

1. You will receive your ARX tokens immediately in return from the smart contract. Normal transaction processing times apply.

Assistive Reality ARX Pre-sale information

Presale contract address: **0x4Ee1d7720a04072142B2efC9d2C7d5d77Ad63939**

Etherscan link for Pre-sale contract:

<https://etherscan.io/address/0x4Ee1d7720a04072142B2efC9d2C7d5d77Ad63939>

Github source code for token contract (fully regression tested and security audited)

<https://github.com/assistivereality/ico/raw/master/masterARXtoken6presale.sol>

Type of Supply: Fixed, static, no more can be created

Supply total: 318,000,000 (includes 16M private sale packages, 8M presale, 250M ICO, 12M frozen employee bonus tokens, and 32M foundation fund allocation)

Participating in the ICO:

The ICO contract parameters, **address** and **JSON** interface definition are below:

ICO ARX token offering on <u>Ethereum public blockchain</u>	
ICO Token, Symbol, Name	ARX, Assistive Reality
ICO Contract Address on Mainnet	0x0 TBC Etherscan link
Start date/time (approx.)	<u>Tuesday 31 October '17, 7:00PM GMT</u>
Start block	TBC
End date/time (approx.)	<u>Tuesday 31 November '17 7:00PM GMT</u>
End block	TBC
Duration	4 weeks
ICO Maximum (cap)	55,000 ETH
Type of sale	Static – 250,000,000 ARX pool
Price	Floating based on current date <TBC>
Security Reviewed	Yes (numerous)
Halt protect	Yes
Source code	https://github.com/assistivereality
JSON definition	TBC
Information URL	https://aronline.io/arx-ico-pre-sale-information/

Pre-sale and ICO Legal disclaimer

By participating in the Assistive Reality ARX Pre-sale and/or ICO Token Crowdsale or making use of any information in this whitepaper or available on the aronline.io website, you agree to the following:

GENERAL WARNING-

By using the services provided by Assistive Reality, you the (User) as either an Initial Coin Offering (hereinafter – Pre-sale and/or ICO or Crowdsale) participant or (User) of Assistive Reality alpha products or services, fully understands and agrees with the following:

- User understands and acknowledges that ARX tokens will be provided by the Pre-sale and/or ICO smart contract in the order that transactions are received by it and no alteration of this can be made by any party
- User understands that Assistive Reality carries no liability for the ability to take part in the Pre-sale and/or ICO for reasons beyond the control of Assistive Reality including but not limited to the Pre-sale and/or ICO duration, transaction mining delays and node-related issues
- Pending a successful Pre-sale and/or ICO, Assistive Reality team members will be focused on completing the company start-up and delivering on milestones. However Assistive Reality undertakes no obligations to act on behalf and in the interests of User in the Pre-sale and/or ICO being held in the future
- User understands that by transferring assets to Assistive Reality, User makes the final decision on deposition of cash or other assets and has no right of refund except that which is provided by the Pre-sale and/or ICO smart contract code itself (that being, a 100% refund when capital raised is under the minimum cap and the Pre-sale and/or ICO/crowdsale period has expired)

TAX WARNING-

User understands that Assistive Reality does not act as a tax agent of User; User and Assistive Reality carry their tax obligations solely under the applicable laws of the country and location they reside in. Assistive Reality is not a tax agent and therefore shall not provide Users' financial information to any third parties. This information shall not be disclosed unless officially requested by government authorities.

NO WARRANTIES-

All of the information provided within this whitepaper is provided “AS-IS” and with no warranties. No express or implied warranties of any type, including implied warranties of merchantability or fitness for a particular purpose, are made with respect to the information, or any use of the information, on this site or platform. Assistive Reality makes no representations and extends no warranties of any type as to the accuracy or completeness of any information or content in this whitepaper or regarding this platform.

DISCLAIMER OF LIABILITY-

Assistive Reality specifically disclaims liability for incidental or consequential damages and assumes no responsibility or liability for any loss or damage suffered by any person as a result of the use or misuse of any of the information or content in this whitepaper or on the aronline.io website. Assistive Reality assumes or undertakes no liability for any loss or damage suffered as a result of the use, misuse or reliance on the information and content in this whitepaper or on the aronline.io website.

In no event shall Assistive Reality be liable to User for any special, indirect, incidental, consequential, exemplary or punitive damages (including lost or anticipated revenues or profits and failure to realise expected savings arising from any claim relating to the services provided by Assistive Reality) whether such claim is based on warranty, contract, tort (including negligence or strict liability) or otherwise or likelihood of the same.

USE AT YOUR OWN RISK-

By using the Pre-sale and/or ICO smart contract for ARX, the Assistive Reality platform or aronline.io website including but not limited to the transferring assets to Assistive Reality, User confirms that he undertakes and understand all the possible risks that directly or indirectly arise from the activity connected with User's participation in the Pre-sale and/or ICO and/or use of Assistive Reality services and products.

FORCE-MAJEURE-

User understands that Assistive Reality will not be liable to User for any breach hereunder, including for failure to deliver or delays in delivery of the Services occasioned by causes beyond the control of Assistive Reality including but not limited to unavailability of materials, strikes, labour slowdowns and stoppages, labour shortages, lockouts, fires, floods, earthquakes, storms, droughts, adverse weather, riots, thefts, accidents, embargoes, war (whether or not declared) or other outbreak of hostilities, civil strife, acts of governments, acts of God, governmental acts or regulations, orders or injunctions, or other reasons, whether similar or dissimilar to the foregoing (each a "Force Majeure Event").

NOT A SECURITY, ALTERNATIVE-TO-CASH OR OTHER VALUE HOLDER-

User understands that Assistive Reality ARX tokens are not offered as a security, share, alternative-to-cash or any other form of tangible value holder. Tokens are to be used and consumed on an entirely individual basis separate from the operation of cash assets or other transfers to/from fiat currency cash holders. There is no relationship between ARX tokens and monetary value other than that conferred by third-party digital currency exchanges unrelated to Assistive Reality. At no point in time does Assistive Reality confer, imply or grant any value to ARX tokens other than ARX tokens can be used to unlock unique items within an Assistive Reality experience, application, or platform tool.

FINAL WARNING-

Pre-sale and/or ICO participations can be considered High-Risk Trading; purchasing financial instruments via a Pre-sale and/or ICO or utilising services offered on the website may result in significant losses or even in a total loss of all funds invested.

- No information provided on Assistive Reality's platform or website should be interpreted as investment advice. It does not constitute an offer or invitation by Assistive Reality to any User to buy or to sell tokens or make any investment.
- User guarantees that he is a legally capable person of a majority age and complies with legal rules and applicable laws of the jurisdiction where the User lives.
- User guarantees the purchase of ARX tokens does not contravene legislation in their country and/or geographical area pertaining to the purchase, storage, and exchange of digital currency assets including tokens.
- By participating in the Pre-sale and/or ICO User confirms that he has read, understood and agree to comply with all restrictions set forth above.

Appendix A: JSON definition for Pre-sale contract

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Appendix B: [JSON definition for ICO contract](#)

TBC