SOAR

Decentralised Drone Platform

Whitepaper - Version 1.6

soar.earth

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Executive Summary

"Drones are already generating climate data, monitoring the borders and more - and they're just scratching the surface of their commercial potential"

- Goldman Sachs

Soar is a **decentralised platform** for high-quality drone content that connects customers with content creators in a **secure, trustless and distributed** blockchain community.

The first stage of the implementation of Soar will be the creation of a marketplace for drone content including still images, video, aerial maps and other specialist drone content. The Soar marketplace will allow drone operators to upload and sell content to other Soar users anywhere in the world. The Soar marketplace has the potential to allow an exponential increase in the value of mapping data and drone content by realising the untapped financial potential of existing drone content. Furthermore, by securing the integrity of drone content metadata via smart contracts, Soar automatically and transparently publishes the location, time and equipment type used to capture content onto the blockchain. The use of blockchain technology validates the authenticity of the footage to ensure the integrity of drone content and fight the problems such as 'fake news'.

However, this is not the end-game. Progressively, by aggregating the content collected from thousands of drone operators, Soar will in due course create a dynamic database for the world's first super-map at an unprecedented level of detail. All connected using blockchain technology to share data.

Leveraging the expansion in drone usage by both business and consumers, Soar will provide an opportunity for drone owners to monetise their content. Commercial drone sales in 2017 were expected to exceed US $1 billion[1]. The expanding drone market is largely driven by the tremendous growth in commercial applications of drone content and footage in industries such as infrastructure, mining, agriculture, journalism and real estate with an addressable market estimated to reach **$127 billion by 2020**[2]. The growth rates in the market have been estimated to be between 15-25% CAGR over the next five years[3, 4].

Despite the rapid growth of the drone industry, there is an absence of a suitable marketplace for drone content or facility for licensed drone operators to fully optimise and **monetise their content**. Soar will directly address this lack of a market for content. Furthermore, there has not been direct access to mapping technology which would allow this content to effectively seed a super-map platform and take advantage of the extremely high-resolution content of which drones are capable.

The Soar marketplace will allow:

- Buyers to easily locate and buy drone content already on Soar;
- Buyers to offer a SkyBounty on an area which rewards drone operators to upload content to match the SkyBounty needs; or
- Drone operators to upload content under a SkySponsor arrangement for sale in an open market environment.

Soar will provide this platform for content providers and purchasers, transacting with the SkyMap token (Symbol:SKYM), a utility token that unlocks a range of capabilities on the Soar Platform. Owning SKYM tokens allows customers to utilise the platform and rewards the content creators.

The SKYM tokens unlock key features of the Soar platform by allowing the user to:

- Purchase drone content;
- Create SkyBounties for specific areas;
- Qualify individuals and organisations as a SkySponsor on the Soar platform; and
- Provide the economic initiative for the eventual seeding of the world's first super-map.

Buying drone content from the Soar platform using SKYM is a simple process of browsing and searching the Soar platform for the desired content and buying it with SKYM tokens. This transaction is recorded on the blockchain.

Soar's SkySponsor model allows for curation of the content as the SkySponsors will only support content that is likely to be used, thereby increasing the overall content quality uploaded to Soar.

The driver for the SkySponsor model is extremely compelling as it effectively proves the economics for seeding the Soar super-map. The super-map will be both dynamic and temporal; over time it will evolve to only exhibit the 'best of the best' imagery. The basis of this super-map is not limited to merely a simple blockchain application, rather, it will serve as the foundation for an unprecedented mapping protocol to power other blockchain solutions which require mapping and imagery inputs.

1. Soar Vision

1.1 The Soar Opportunity

The Soar platform is tapping into an emerging market opportunity to become the leading open marketplace for drone content including photo and video content. Currently, most drone operators only use a single channel to sell their content: on commission from a customer. Moreover, in many instances this content is limited to localised markets. This one-to-one approach to sourcing drone content limits the opportunity for drone operators to resell to other interested parties or organisations without it having to be re-flown.

The Soar platform's approach will allow drone operators to potentially grow drone content sale and monetisation to a global scale and unlock the potential value in underutilised drone footage. With its unique approach to validation of the drone content, buyers know exactly where and when drone content was collected and the blockchain technology ensures the integrity of this information is easily verified.

The potential value creation of drone footage marketplace is challenged by the lack of standardisation of content formats and the significant file size of high quality drone footage. As Soar is compatible with a broad range of drone content file types, this removes the problem of content format standardisation and its cloud based storage approach removes the problem of localised storage and delivery and long download times.

Moreover, much of the valuable geospatial knowledge held within drone imagery and data today remains unrecognised and unutilised for the vast majority of drone content creators. Hardware metadata and other geospatial data relating to the location coordinates of the imagery and the temporal components captured in existing drone imagery can potentially hold significant value for a wide range of industrial and consumer applications. For example, amateur drone footage taken of a beach on a family vacation could have significant commercial or research value for scientists looking to study coastal erosion, pollution or vegetation loss.

1.2 Why Does Soar Use A Blockchain?

The decision for Soar to use the Blockchain can be summed up by the utility of the blockchain in providing the verification and authenticity of drone content uploaded to Soar. By securing the integrity of drone content metadata through its smart contracts, Soar automatically and transparently publishes a range of data to the blockchain which includes:

- The file's hash
- Location, date, altitude, type of drone used to collect the content
- Title, description, keywords and other information associated with the content
- Content storage address
- The wallet address of the drone operator
- The wallet address of the SkySponsor
- Sales transactions

When the blockchain technology is combined with Soar's SkySponsor model (See Section 2.6), Soar provides an immutable record of content creation and distribution and support for the uploading of the content. The use of the blockchain to record drone metadata will prevent problems identified with such issues as drone content becoming part of the current problem with 'fake news'.

1.3 Origins of Soar Technology

The strength of the Soar platform comes from almost a decade of development driven by the core objective to **democratise geospatial technology to any potential user**. During this period, the development team behind the Soar platform have launched several highly successful commercial mapping applications that have empowered tens of thousands of users from over 80 countries in the collection, visualisation, and analysis of geospatial data.

The Soar platform has evolved from a military pedigree when, in 2015, the Soar team were approached by the US Department of Defense to submit alternative mapping technologies on the back of the growing number of US Marines and Army units that required geospatial applications in tactical situations. The US military expressed interest in further developing this application so that it could run on a warfighters mobile device such as a tablet and radically enhance real-time geospatial awareness between tactical units in the field.

What followed was an intense vetting program involving tactical feature updates, security clearances, rigorous scrutiny of the technology code and further development of encryption coding. In 2017, the technology behind Soar successfully passed the military onboarding process and was introduced into a closed application platform that was available only to US military personnel.

During this time, working alongside the US Military, the original technology application was enhanced through a combination of game-design, social media work-flows, industrial psychology and some additional classified technologies. Many of the enhancements were specifically designed to assist soldiers in unique tactical scenarios, but ultimately the result was a sophisticated technology responsible for the standardisation and multilateral application of geospatial data.

This technology of course also required the ability to enable all types of mapping imagery and content to be made available to the user. This included drone, aerial, satellite, thermal and multi-spectral imagery; all accessible via multiple inputs, offline and without storage limitations.

As of August 2017, the technology behind Soar was made available to commercial and civilian applications. This technology has now been adapted to become not only the platform for the Soar marketplace but also the foundation for the end-state which is a global super-map protocol.

Figure 1: Soar's military origins from tactical mapping applications (Source: Takor Group).

1.4 The Growing Drone Market

Note: *In this is document the following definition applies for the term 'drone operator': "Any individual or organisation that has access to drone in a non-recreational role." This definition includes individuals who are licensed drone operators, through to businesses and larger organisations which collect data as a service. Additionally, content creators can also be individuals or community groups which maintain expertise in the operation of drones and distribution of content collected by them.*

The Soar marketplace has been designed to tap into a need within the growing drone industry. The market for consumer and commercial drones is expected to grow rapidly over the short to medium term. There is significant value within this market and the Soar platform will help drone operators to realise improved commercial returns from their drone content.

The global addressable market for aerial drones across all industry sectors has been estimated by accountants PwC as being in the order of US$127 billion, based on the value of manual labour services that can be replaced by drone powered solutions[5]. The industries benefiting from this unprecedented opportunity shown in Figure 1 below.

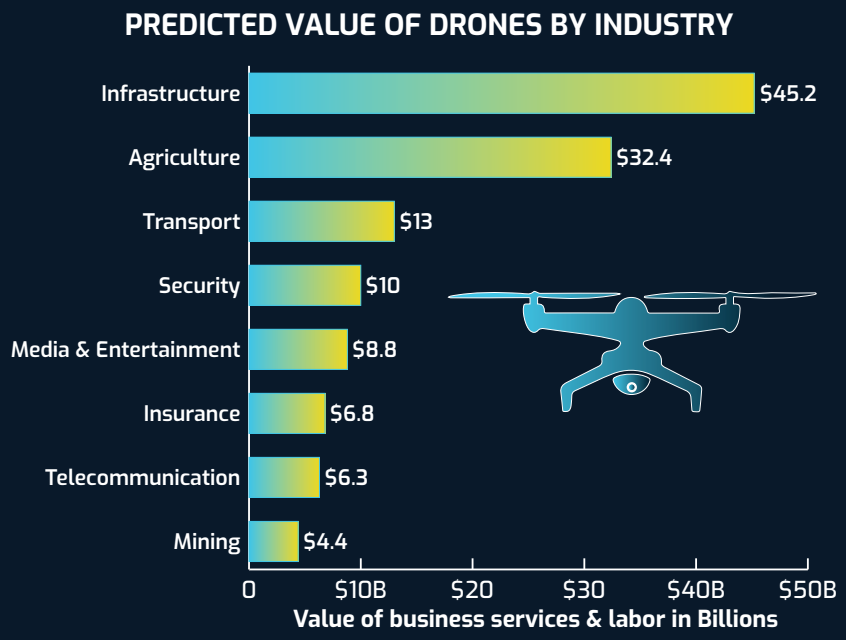

Figure 2: Breakdown of the $127 billion global market opportunity for drones (Source: PwC /Tech Insider).

The United States has been a particularly strong source of commercial growth in the drone market, with the value of commercial, non-military drone sales and services rising from $40 million in 2012 to about $1 billion in 2017[6]. By 2026, estimates are that commercial drones - both corporate and consumer applications - will have an annual impact of adding $31 billion to $46 billion to the US GDP[7].

The value of sales for the commercial drone market has been estimated to be growing at an annual rate of between 15.5[8] - 25%[9] CAGR over the period to 2025 as illustrated in Figure 3[10] [11] [12] on the next page.

To emphasise this growth rate, the US Federal Aviation Administration (FAA) registered over 60,000 drone pilots in the US in 2017 alone with this expected to grow in the future as drone operations replace manual and higher cost operations. However, while the commercial market

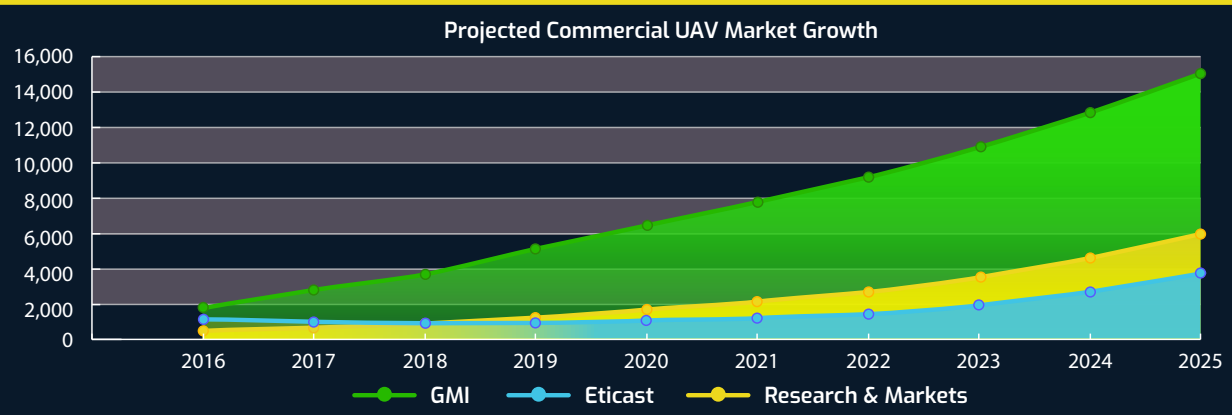

Figure 3: Projected growth estimates of the commercial drone market to 2025 (Source: Global Market Insights).

is estimated to grow significantly, investment bankers Goldman Sachs projects that the military will continue to be the core driver of market value for drones as can be seen in Figure 4 below.

These rapid growth rates for the commercial drone market demonstrates the future opportunity for a market for drone imagery and services, as there yet remains the unmet need for a better way for drone operators to distribute and monetise drone generated content. While it is anticipated that as the sales of drones slow due to market saturation in the medium to longer term, the opportunity for drone imagery to be utilised by multiple parties will increase over time. With the development of new and better drone sensor technologies, the opportunity to capture imagery across a broad spectral range will also grow their usage potential.

The market for drone applications has grown with increasing capabilities of their hardware, sensor and software platforms, increasing the number of industry sectors where drone-based data is applicable.

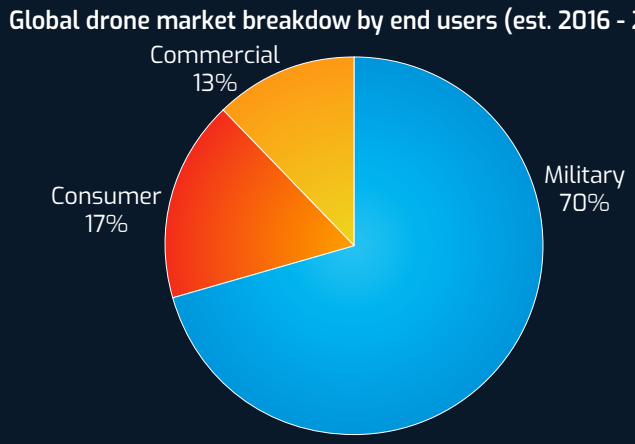

Figure 4: Breakdown of the value of the global drone market by end users for estimates 2016-2020. (Source: Goldman Sachs)

Market applications for drone content are broad and include industries such as:

- Infrastructure & asset management;
- Mining;
- Insurance;
- Environmental;
- Agriculture, forestry & fisheries;
- Oil & gas;
- News, tourism & entertainment;
- Property and real estate;
- Power & utility management;
- Emergency services;
- Security & law enforcement; and
- Scientific research.

Examples of the applications of the use of drones for some of these sectors include:

Infrastructure
- Construction monitoring such as site surveys and data gathering for progress reporting;
- Inspection and maintenance to identify assets in need of repairs replacing personnel based visual inspection;
- Inventorying assets and monitoring any asset changes.

Insurance
- Risk and damage assessment in areas exposed to natural disasters
- Claims management and fraud prevention through an initial assessment of properties and rapid, low cost detection of change after the report of an incident.

Agriculture
- Soil and field analysis and crop planning through the production of high-quality 2D or 3D maps;
- Crop monitoring using drones carrying near infrared (NIR) multispectral or thermal cameras to identify areas in crops undergoing water or other stress as well as the identification of areas within the crop which may be affected by weeds or disease;
- Crop spraying using high precision drones to deliver a range of chemicals to specific locations to treat weed or disease infestation or provide other crop treatments.

Mining
- Mapping for mine site planning and logistics;
- Exploration through providing identification of surface features indicating mineralisation of interest;
- Environmental monitoring to detect changes in vegetation, waste disposal and potentially identify any pollution produced;
- Production monitoring including detecting any changes to the mine structure which will impact production.

Emergency services & medical
- Detection of flame fronts and flare-up risks during fire-fighting;
- Delivery of medical supplies in disaster areas

News, tourism & entertainment
- Filming for the reporting for news and sporting events;
- Capture of footage not otherwise available for documentaries;
- Image capture for movies and advertising;
- Content for tourism promotion

(Source: Pexels)

Figure 5: Examples of industry applications of drone content that will be available on Soar.

Low-cost drones for non-precision work are likely to become commoditised over the next decade, but surveying applications and high precision operations are likely to maintain a premium position in the market. The implication of this is the value of commercial drone operations with high precision, georeferenced data will become of greater value to end user.

All of the above builds a compelling fulcrum for the development and use of the Soar platform.

(Source: Pexels)

2. The Soar Solution

Soar is a decentralised global marketplace that will revolutionise the value, applications and significance of almost all drone content.

The Soar platform will unlock previously unreleased, unutilised and largely inaccessible commercial value of drone content, whereby a single data upload could represent **an infinite number of commercial applications, facilitating an incredible monetisation opportunity for existing owners of drone content**. This changes the current industry paradigm of a one-to-one transaction on a contracted or commissioned basis to a truly multilateral dimension.

2.1 Skymap Tokens

The Soar platform uses the SkyMap token (SKYM), an ERC20 compatible token which allows customers to utilise the platform and rewards content creators.

The SKYM tokens will be used to:

- Purchase drone content;
- Qualify individuals and organisations as a SkySponsor on the Soar platform;
- Create SkyBounties for specific areas; and
- Provide the economic incentive for the eventual seeding of the world's first super-map.

The SKYM token differentiates itself from a pure payment cryptocurrency, such as Bitcoin: SKYM is not simply used as the method to a payment exchanged in return for a services but also allows certain interactions with the Soar platform, described later, that are not available to anyone not holding SKYM tokens.

The price in SKYM for a piece of content for a given location within Soar is affected by the supply and demand for that content at a particular time. The value denominated in SKYM for a piece of content is set by the Soar marketplace economic model described in section 2.3.1 below.

2.2 The Soar Quadtree

To facilitate the calculations of value on the platform, Soar divides the world into a grid. Each cell within the grid is further subdivided into four sub-grids, a process that repeats until a desired level of resolution is achieved. Each zoom level has 4n sub-grids of the original grid, where n is the number of zoom steps in. This data structure is known as a quadtree[13] and is utilised by mapping software to efficiently deliver maps at any desired resolution or zoom level. An example of how the zooming into a quadtree works can be seen in Figure 6 below.

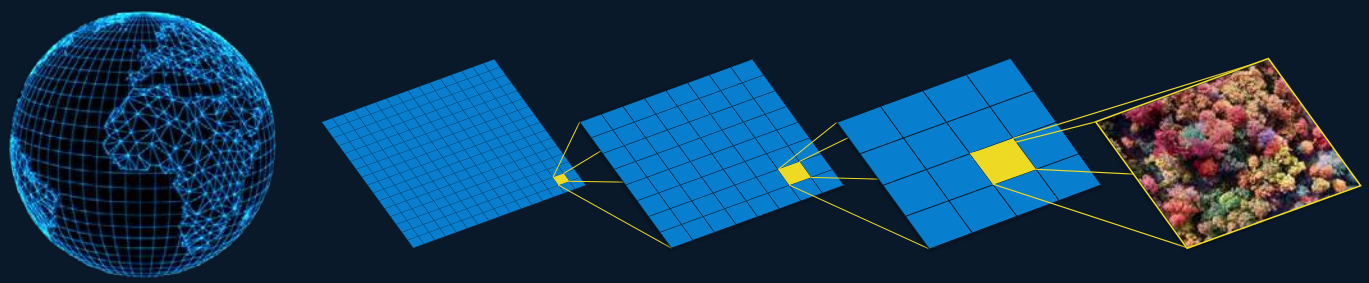

Figure 6: Soar's unique quadtree illustrating that images can sit within a grid at different resolutions.

Soar's quadtree, unlike others in existence today, can reach a much greater level of detail to support the mapping resolution drones are capable of reaching.

The design of the Soar Quadtree will allow potential expansion in the future as the images on the Soar quadtree do not necessarily have to be from drones and can be sourced from multiple sources such as satellite, aerial and even 3D visualisations.

2.3 The Soar Marketplace

The cost of purchasing content from the Soar platform is determined by the supply and demand of drone content available for a given area through Soar can be visually represented by a heatmap. The heat map enhances the planning for drone content capture for financial returns and an example of how the heatmap is shown on Soar is in Figure 7 below.

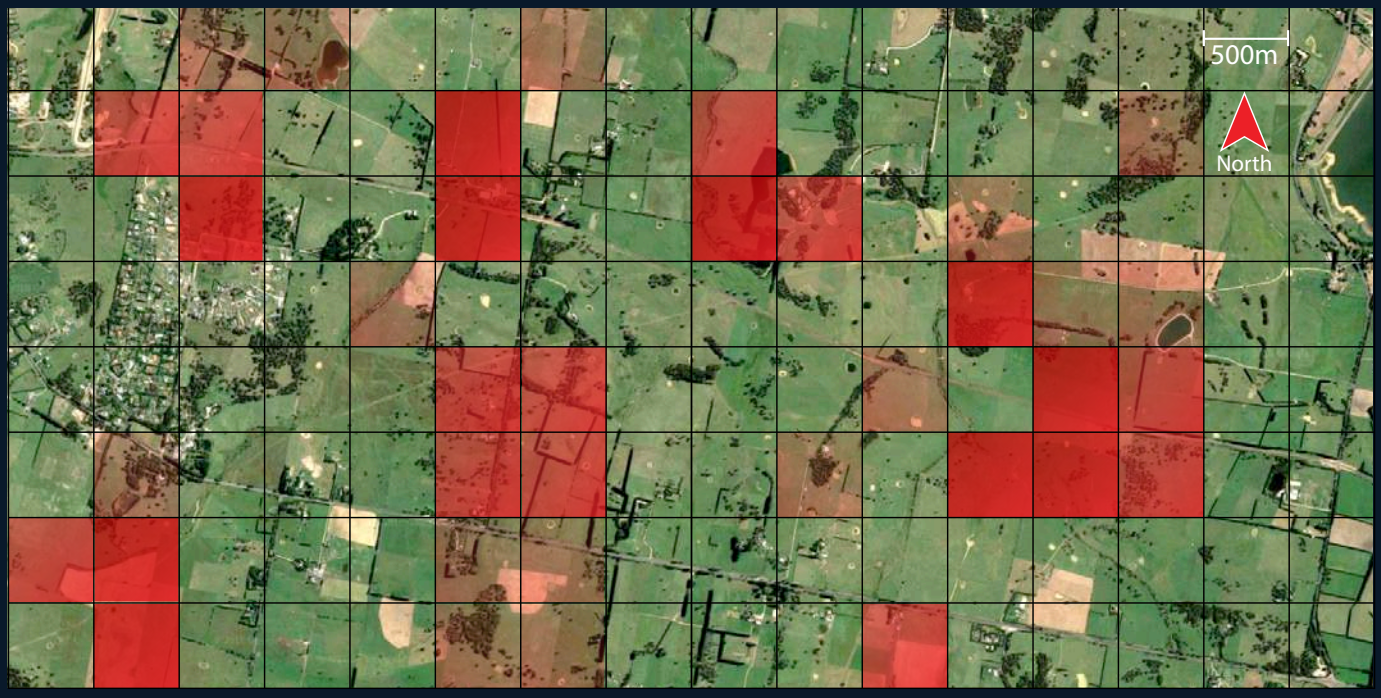

Figure 7: An example of a heat map showing different levels of activity at a particular zoom level at a point in time.

The heat of an area on the Soar map is a function of the total value of drone content (from both sales volumes and content available) for each of the sub-grids within the quadtree grid. As such, the heatmap provides Soar users with a real-time indicator for the demand of drone content for a location over time. The change in the relative heat of a quadtree sub-grid will be seen during notable events, human created or natural, when drone content is uploaded to Soar; the heat map will increase in intensity in the quadtree grid covering that event. This change in the heat is a signal to drone owners or content buyers showing that there is demand for content in that area.

Examples of events that might drive demand and increase heat value might include:

- Natural disasters such as earthquakes, floods etc
- Sporting events such as triathlons, fun runs etc.
- Public events.

2.3.1 Soar Content Price Calculations

The price for content will be initially set by Soar but after launch will be subject to market forces based on supply and demand. The base market price, P_G, for a given grid in the quad tree, *G*, has the following properties:

- The demand-driven sale of data for a given area, Q_D increases the price for that area, which decays over time t_f
- Bounties placed on a given grid area G increases prices which decays with supply Q_S
- Market price starts at, and will trend towards, a configured value $P_{G\,low}$ over time, with demand pushing up the price and decaying toward the base level over time.

There will be a logarithmic increase in price when a given unit of content is sold. That is, the first sale will increase the value as much as the next ten sales, which will increase the value to the same amount as the next 100 sale and so on. The outcome of this function is that spikes in demand do not cause a prohibitively expensive price shock.

So when a sale takes place, this increases the price for content with the new price, P_{new}, calculated as:

$$P_{new} = P_{low} + (P_{old}\,(1 + \log Q_d))\,t_f$$

Where:

P_{new} is the new price index
P_{old} is the old price index
P_{low} is the configured minimum price index
t_f is the time decay factor

We have introduced two important variables in this equation which deserve discussion. The time decay factor t_f represents how long the effect of new demand impacts market price, with no new sales trending the price of a piece of content back to the original price. The minimum price, PG_{low}, represents both the starting price of data and the price it will trend towards in the absence of any additional sales.

Prices for content on Soar are based on a single quadtree grid cell. When drone content intersects multiple grids (n), we use the average market price for each grid calculated as:

$$P_G = \frac{P_{G1} + P_{G2} + \ldots P_{Gn}}{n}$$

The base price and the variables used to calculate price changes will initially be set by the Soar team based on our simulations of operation of the market. Soar will reserve the right to modify these parameters to ensure smooth market operations; however, the community will also be able to vote on modifying these parameters to achieve a consensus-driven approach to the behaviour of the market.

The easiest way to visualise how the market price might change with increasing demand and then falling away is shown in Figure 8 over page.

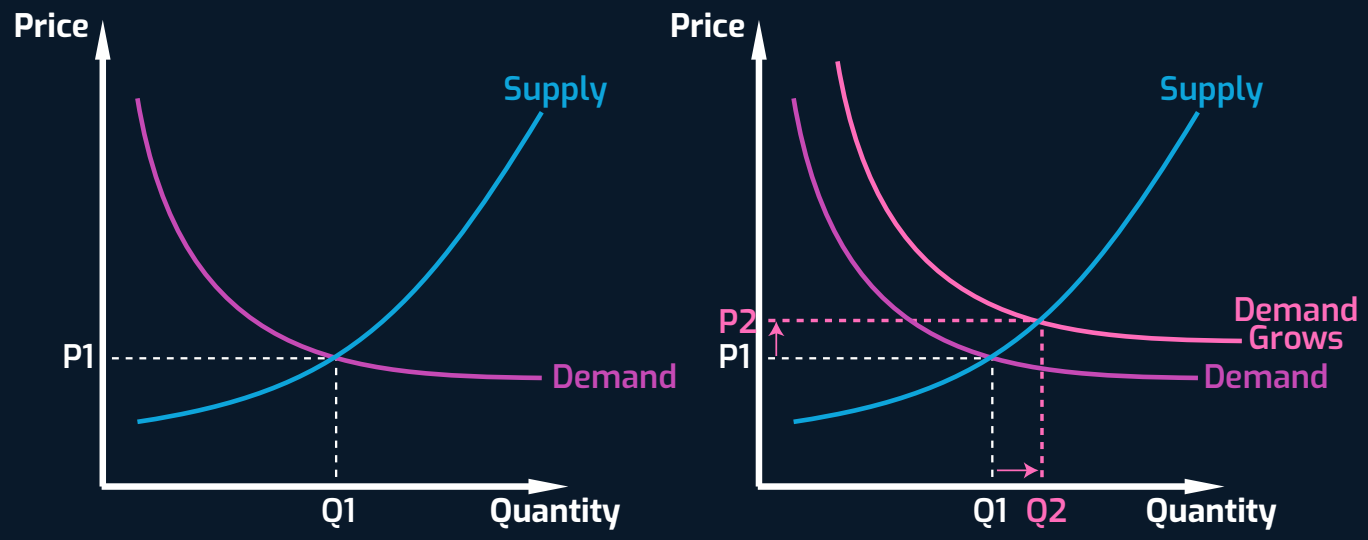

Figure 8: Forecasted price calculations of the Soar marketplace based on supply and demand of mapping content. Note this can be applied to additional data types

2.3.2 Types of Data and Metadata

The Soar platform can hold many different types of data content including:

- Still imagery at any viewing angle;
- Video content at different resolutions;
- Aerial maps giving a bird's eye view of the ground; and
- Specialised content such as multispectral, lidar and thermal imagery.

Soar will be able to deal with multiple formats of drone content. A brief explanation of the types of common drone content is attached at Appendix A to this whitepaper.

i. Video

Drone footage captured as video can be uploaded onto the Soar platform along with its GPS path track. In cases where the drone hardware does not support these GPS path tracks the platform will contain mapping tools for the content creator to specify it.

The price of videos for a given market price P_G is calculated by:

$$Cost = P_G \times VideoValueIndex \times VideoLength$$

ii. Images

High-resolution aerial still shots taken by drones will also be available for exchange on Soar, and the position, altitude, bearing and angle of incidence will be cited along with a watermarked preview for customers to review before purchase.

Most of this metadata, including position, is automatically extracted from the files EXIF[14] data; however, mapping tools will be available to the content creator to fine tune this in the event they don't have the desired accuracy.

The price of images for a given market price P_G is calculated by:

$$Cost = P_G \times ImageValueIndex \times ImageSize$$

The quality of drone content is often significantly better quality than comparable satellite and aerial photos as can be seen in Figures 9.1 to 9.2.

Figure 9.1: Google Maps imagery compared to the capabilities of the Soar platform. The differences in quality is compelling (Source: Dronestagram).

Figure 9.2: Google Maps imagery compared to the capabilities of the Soar platform. The differences in quality is compelling (Source: Dronestagram).

iii. Aerial Mapping

Aerial maps are a series of top-down images that are combined in a process called ortho-mosaicing. Various tools exist to assist drone operators to create aerial maps from captured drone images. Metadata for aerial maps will include a polygon bounding box, capture altitude and map resolution. An example of an aerial map stitched together from multiple images is in Figure 10.

The price of aerial maps for a given market price P_G is calculated by:

$$Cost = P_G \times MapValueIndex \times MapSize \times MapResolution$$

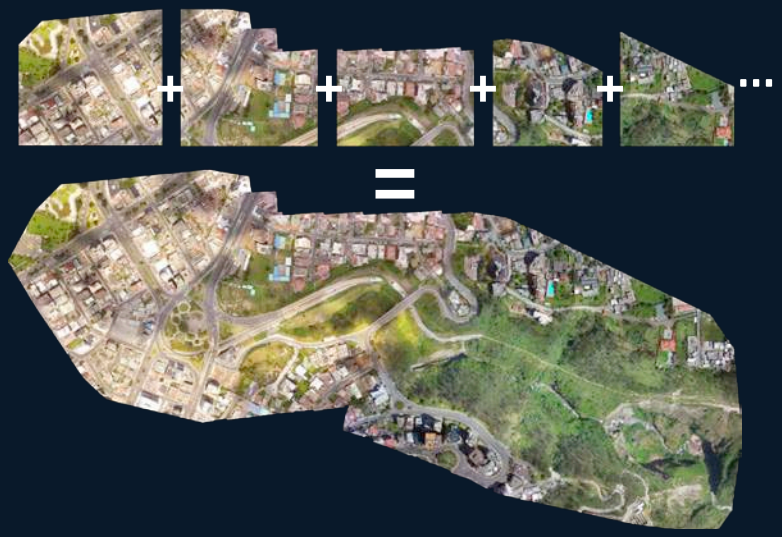

Figure 10: Multiple orthorectified images are stitched together to make an aerial map. (Source: UAS Sky Is The Limit)

iv. Specialist data

Drones are capable of capturing more than just visible light imagery and video. They can be used to capture data from a range of sensors such as thermal infrared, Lidar, radar, multi-spectral bands or some other combination of sensors for specific purposes. Specialist data may also include pre-processed images and video content. An example of specialist data in the form of thermal imaging can be seen in Figure 11 below.

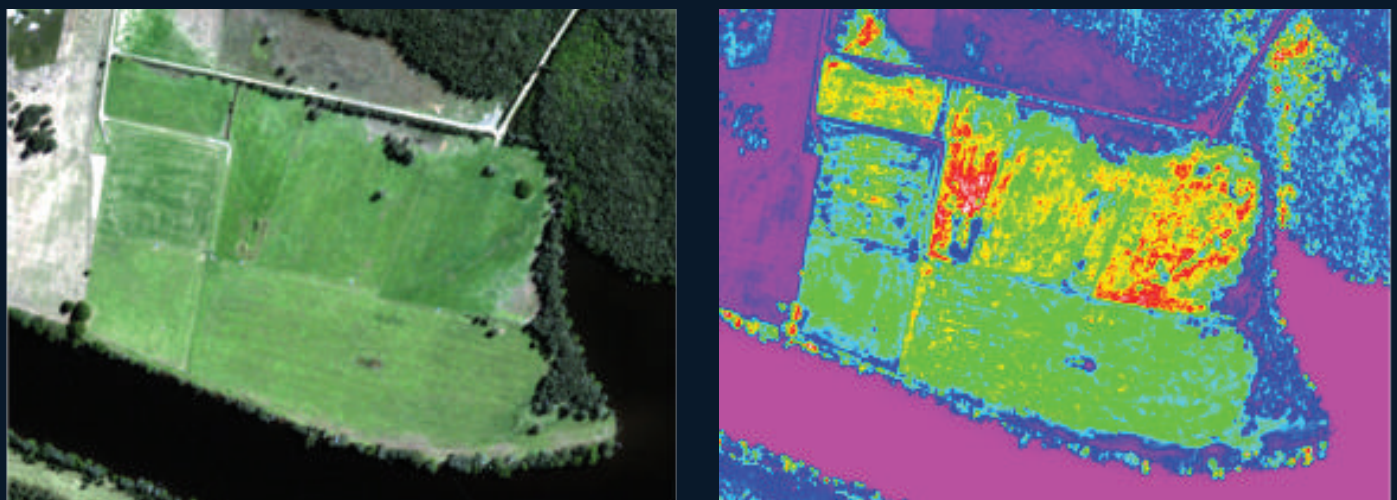

Figure 11: True color imagery compared to specialist sensors such as thermal imaging over farmland in eastern Australia (Source: Takor Group).

Soar will accommodate these specialist datasets by permitting content creators to define their own categories. The P_G ***x SpecialValueIndex*** function will reflect the extra value of these data sets.

2.4 Soar Product Prototype

The Soar platform is currently under development and the figures below show the prototypes of some of the operations that will be possible on the Soar platform upon release.

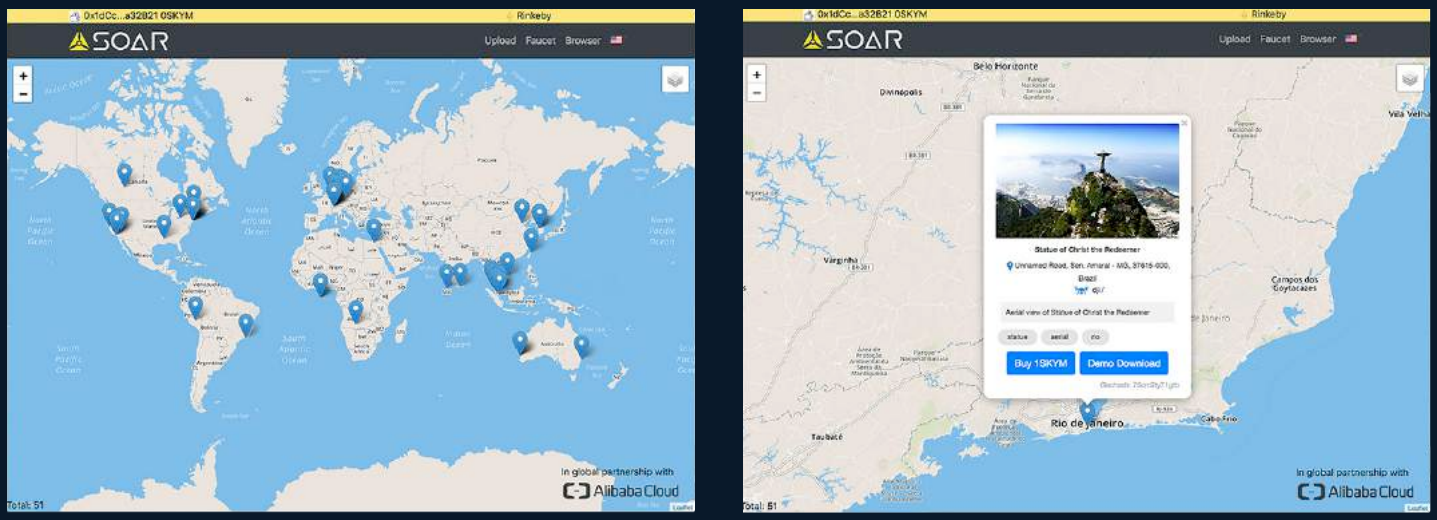

Figure 12.1: Soar platform home page.

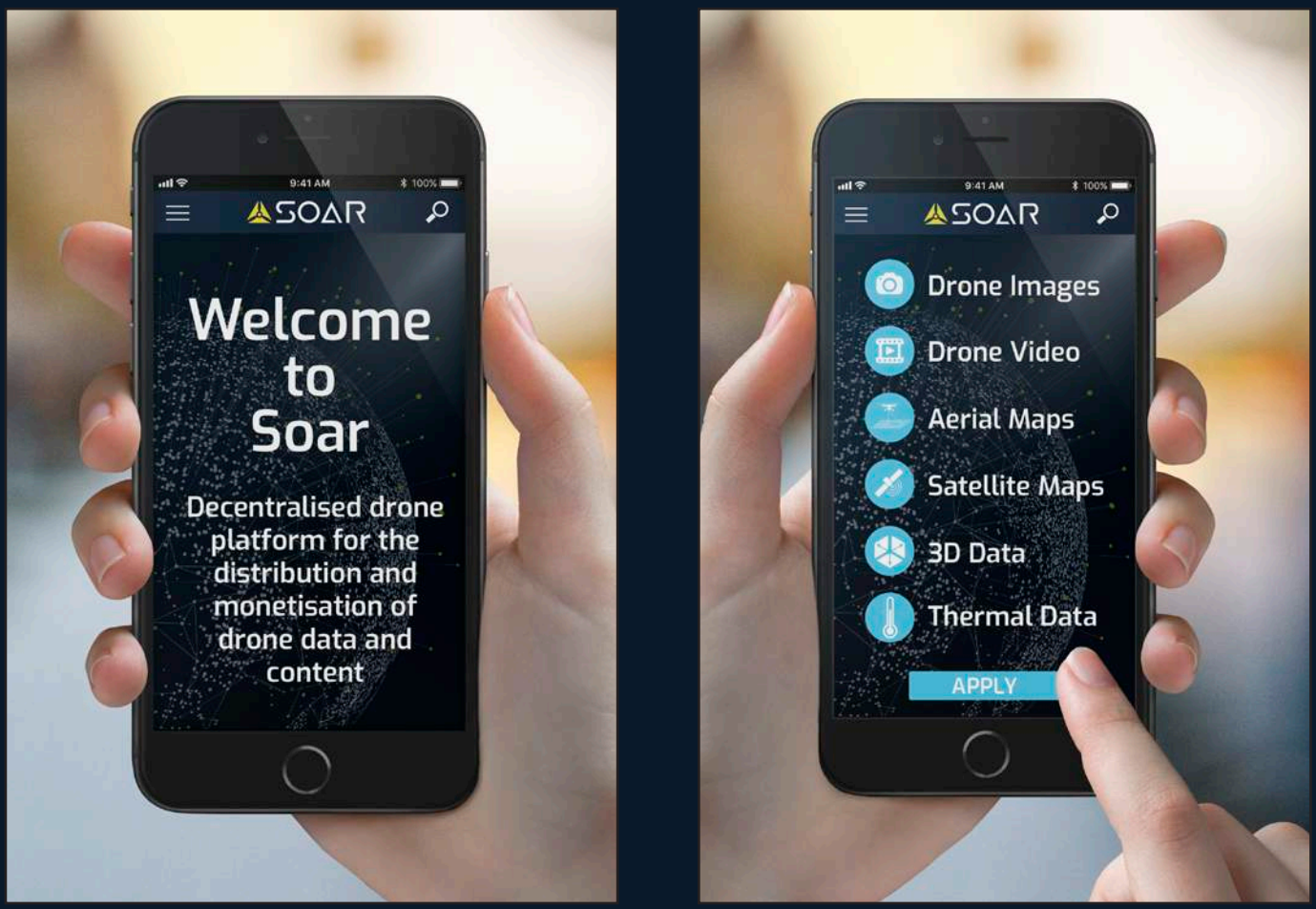

Figure 12.2: Soar platform on mobile.

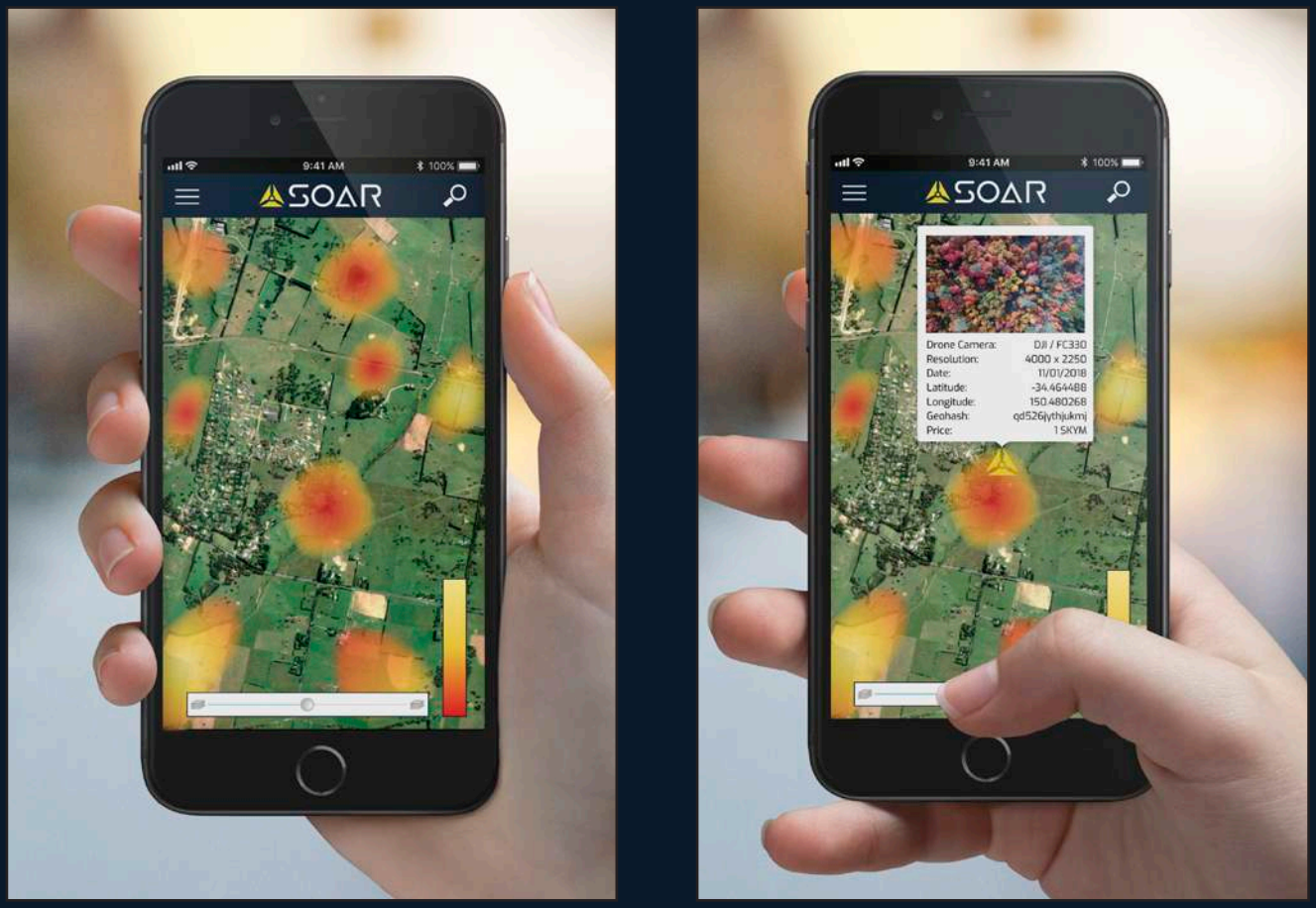

Figure 12.2: Soar platform on mobile.

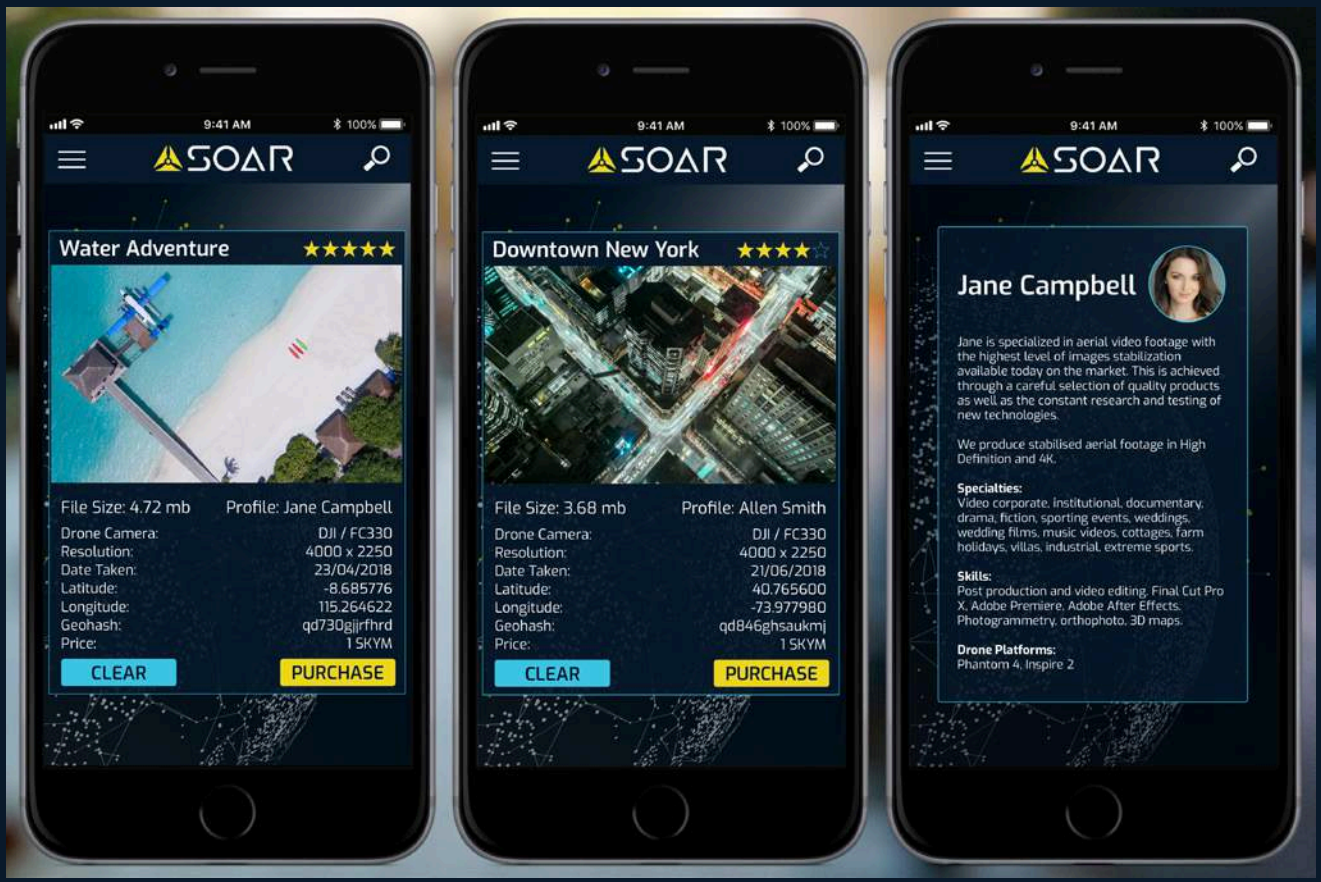

Figure 12.3: Searching the database on the Soar platform

2.5 SkyBounty System

The SkyBounty System is a marketplace feature of the Soar platform as a mechanism to create an incentive for capturing drone imagery for a desired location.

The primary role of SkyBounties in the Soar platform is to give token holders the **ability to drive image capture and upload** for a part of the world where they have an interest. The SkyBounty is a signal to local drone operators that the SkyBounty issuer has demand for content about a specific area. To prevent exploitation of SkyBounties such as empty or low-quality data, only sponsored content is eligible for receiving SkyBounties.

A **SkyBounty provides instant rewards** to drone operators and their SkySponsors for uploading content taken within the SkyBounty area. Soar intends to utilise part of its bootstrapping fund to create SkyBounties over a number of areas to facilitate a rapid growth of available content on the Soar platform.

Examples of opportunities for SkyBounties might be:

- A farmer might place regular, small SkyBounties over his crops to build a pool of content over the course of the growing season. This can be part of the process for assessing how effective the fertiliser strategy was for that harvest.
- A news organisation might place SkyBounites over an area for a specific newsworthy event to build a range of footage for distribution across its various channels.

SkyBounties can be placed on an exact location (i.e. a single grid); however, they will typically be placed at higher zoom levels in the quadtree allowing for a larger area of coverage. When this occurs the SkyBounty is split evenly amongst the grid cells it covers. Content that is submitted for the SkyBounty receive payment based on the area their content covers as a portion of the total SkyBounty area if the content does not cover the whole Skybounty area.

The SkyBounty works by an issuer submitting SKYM tokens to a specific area, which places a value on that grid, and provides immediate returns to the content creators who upload imagery for it.

The portion of SKYM tokens released to the content creators from the SkyBounty is initially 50% of the total bounty, prorated by coverage. Subsequent content submitted for the area from other users reduces the payment of the SkyBounty by half for any areas which was previously captured. How the SkyBounty works is shown in Figure 13.

Figure 13: The framework between the Soar SkyBounty system highlighting the utility of the SKYM token between the SkyBounty issuer and content provider.

A SkyBounty issuer doesn't have any guarantee that their SkyBounty will attract a particular type of content but it does stimulate content generation in the area covered by the SkyBounty.

2.6 SkySponsor Model

As with any high-functioning blockchain platform, there are some significant barriers to entry that may create friction during the onboarding process. The most immediate of these barriers to entry is the cost associated with writing to the blockchain and the cost of online file hosting.

Given the importance of rapid content generation, Soar has designed a mechanism to overcome potential uptake barriers through the introduction of the **Soar SkySponsor model**.

SkySponsors **remove the complexity and costs** of interacting with a decentralised market, while at the same time lending their credibility to the producers content, and vetting high-quality content in the best interests of the consumers.

The only requirement to become a SkySponsor is to hold a certain amount of SKYM tokens, which ensure a stake in the ongoing value of the marketplace. As a reward for sponsoring content, SkySponsors share a portion of the revenue generated by any of their sponsored content that is purchased, including SkyBounty rewards. Figure 14 outlines the method for use of the SKYM utility token as part of the SkySponsor process.

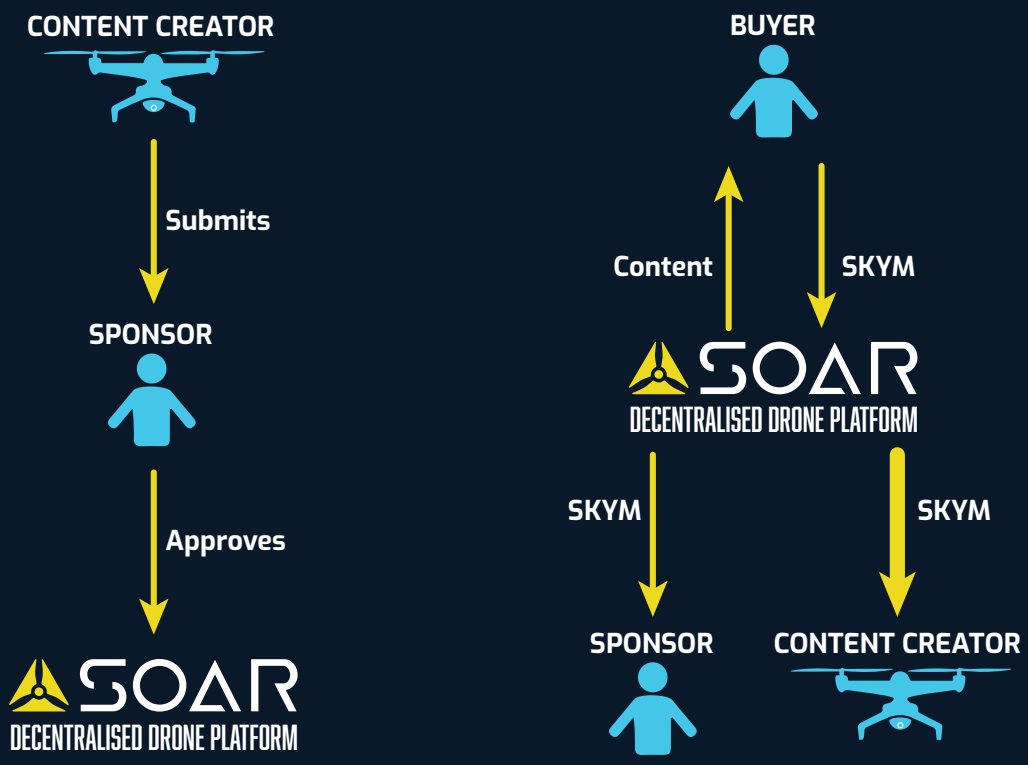

Figure 14: How the SkySponsorship model works.

2.6.1 SkySponsor Model: Market Traction Solution

SkySponsors **reduce the barrier-to-entry** for content creators by allowing the SkySponsors to support content by:

- Enabling content creators to upload content to the blockchain for free;
- Covering the costs associated with writing to the blockchain and data storage; and
- SkySponsors recouping the blockchain and storage costs at a small profit by taking a share of the sales revenue generated by the uploaded content.

2.6.2 SkySponsor Model: Quality Assurance & Content Moderation

Like any platform that deals with the exchange of content, Soar requires a mechanism to mitigate inappropriate content. The Soar SkySponsor model is uniquely positioned to address and solve this issue, by introducing a content intermediary who will be **financially incentivised to moderate** and improve the quality of the footage sponsored.

Sponsorship brings **credibility and accountability** to the content.

- SkySponsors apply their own criteria when approving content. It is in their financial interest to only approve good quality drone content as content that is not purchased will not provide any return on investment.
- A SkySponsor's track record can be determined by inspecting their history on the blockchain.
- Approval of content from a particular SkySponsor lends their reputation to the content.

The Soar community will be offered an opportunity to create whitelists of trusted SkySponsors. End users of the imagery can view the platform and marketplace through the lens of these whitelists, limiting the impact of inappropriate or poor quality content on the platform.

2.6.3 SkySponsor Model: Business Opportunity

The benefit of the SkySponsor model for SKYM token holders is that **you do not need a drone to get involved and generate revenue from content on the Soar platform**.

Content SkySponsors agree to pay for the costs associated with the upload and storage of data into the Soar platform, in exchange for a cut of the revenue generated. After the initial fee of the upload, if the content generates has traction in the market, both the SkySponsor and the original provider will see **passive generation of income** over time.

The Soar SkySponsor model opens up a sub-market of sponsorship on top of the Soar platform. This completely opens the system up for entities competing to pay for users to capture and upload new content.

The passive revenue generation for the SkySponsor is powered by the popularity of the system as a whole. As the number of buyers on the platform increases, the potential market for SkySponsors to compete in advertising and innovation grows with it, and with more promotion, more buyers will come. Thus, a perpetuating, decentralised positive feedback loop is formed that is inherent to the Soar system.

2.6.4 SkySponsor Model: Offchain Cloud Storage

Under the SkySponsor model, it is the task of the SkySponsor to host the data. SkySponsors can directly host their own sponsored content or storage can be through a service provided by a 3rd party cloud storage provider. There are many such providers and as an example, we will use Alibaba Cloud Object Storage Service.

When content uploaded by the drone operator it is submitted to the Soar Platform and held pending approval by the SkySponsor in the their own cloud storage system which was nominated during account creation. SkySponsors manage their queued content from a specialised portal within Soar. In the case of the SkySponsor using Alibaba for their storage, if the content is rejected it is deleted from the SkySponsor's Alibaba cloud account. If the content is accepted, the content would remain in the SkySponsor's Alibaba cloud the smart contract would be executed,

with storage costs and gas paid by the SkySponsor, and the transaction would be written to the blockchain.

When a purchaser buys the sponsored content, they would pay via their Soar account and the content would be downloaded to them from the SkySponsor's Alibaba cloud and the smart contract writing this transaction to the blockchain. This process is outlined in Figure 15 below.

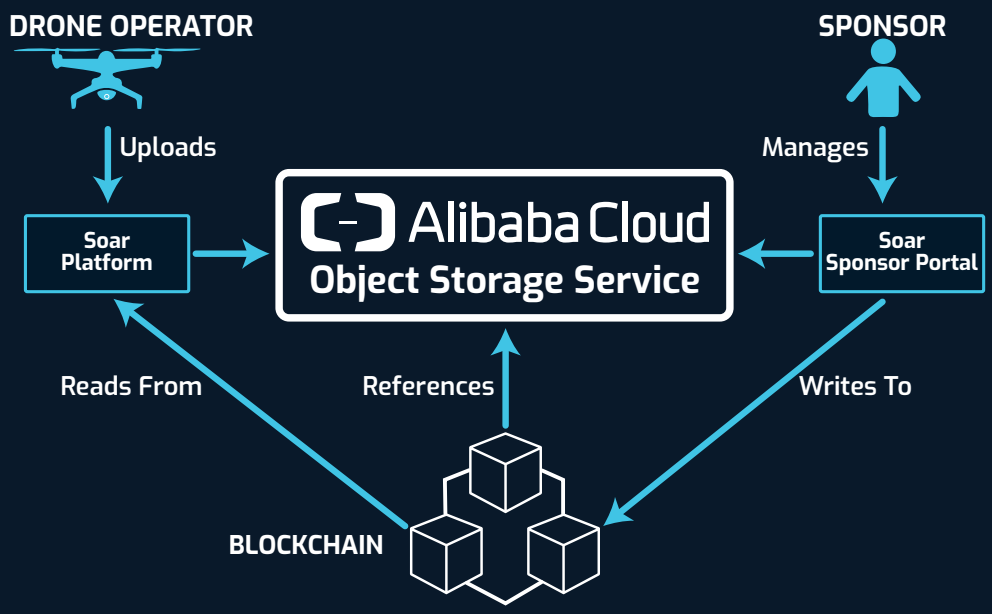

Figure 15: An example of how files are remotely stored by Soar..

2.7 Drone Regulatory Compliance

Soar is not a drone operator but is instead a marketplace for drone generated content and does not accept any liability for any content hosted available through the platform. It is up to the drone operator to ensure that they comply with local regulations and laws when operating and collecting content for submission to Soar.

The Soar frontend will provide links to the relevant compliance material and will ask the content creator for confirmation that the content was generated safely and in compliance with local laws and regulations. It is important to point out that the regulation of drones varies extensively between countries from outright bans to highly permissive regulations[15]. Figure 16 on the following page provides an example of the regulatory considerations for capturing commercial drone content in Australia.

It is also important to note that some drone manufacturers maintain their own internal safeguards for where drones can fly through the use of firmware embedded in the drone which recognises location and no-fly zones. For example, if the drone is too close to an airport, it not be able to launch due to an internal geofencing system encoded within the firmware.

The safeguards to ensure compliance are built into the infrastructure of the Soar platform and flow on as a natural consequence of the blockchain technology stack. Details about the date and location of flight and the hardware used are immutably written to the blockchain, making accountability an incorruptible tenant of the platform. A user engaging in illegal, immoral or unsafe activities can potentially be identified from the metadata that is written to the blockchain.

Ideally, any inappropriate content will be identified before it even enters into the Soar ecosystem.

The Soar SkySponsor model fulfills this role and any SkySponsor who has a history of approving inappropriate content may have their SkySponsor status terminated by Soar or they may find themselves blacklisted by the community. Finally, the Soar team will reserve the right to block a piece of content from further sales should there be issues found about it being inappropriate or illegal.

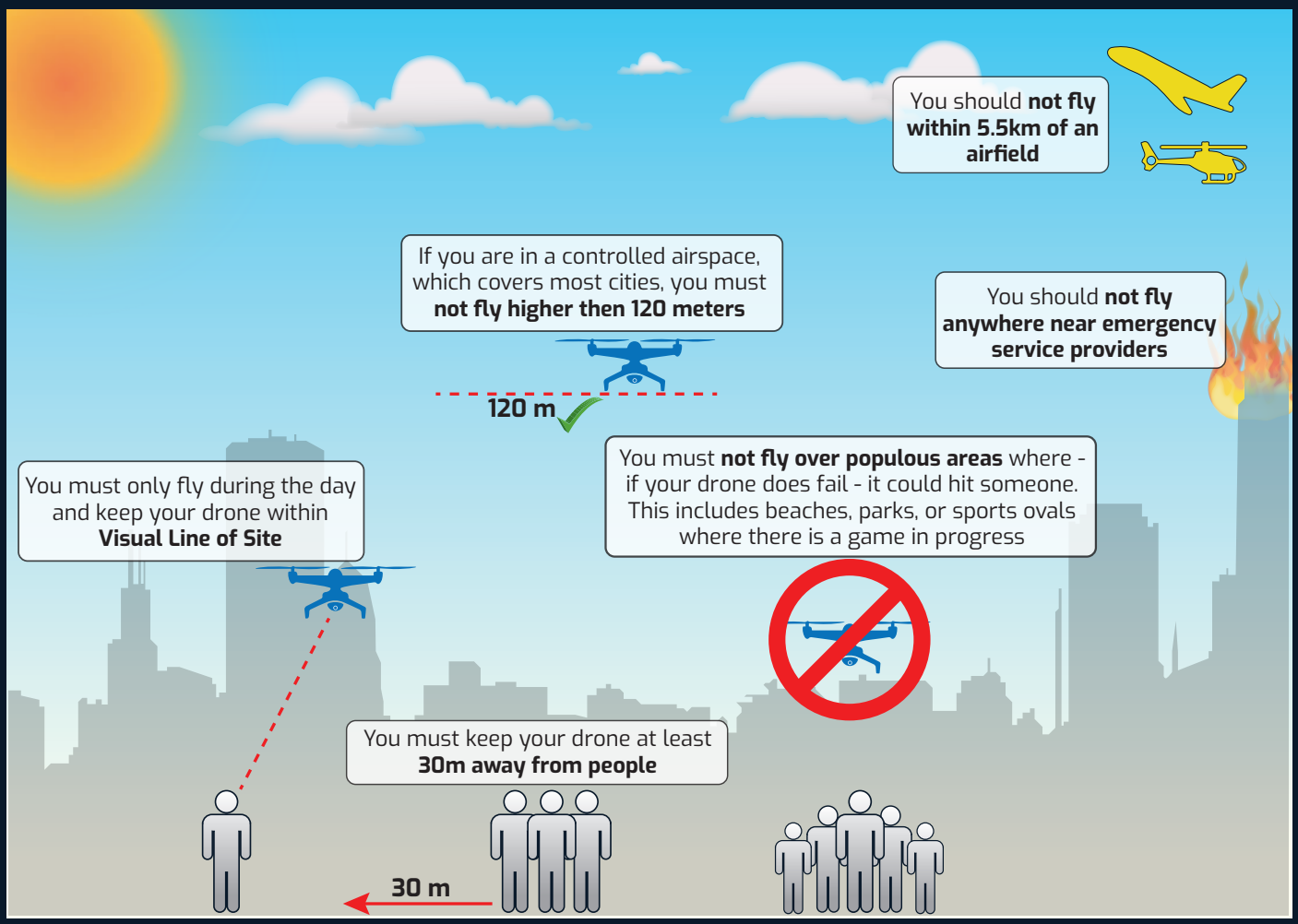

Figure 16: Infographic highlighting the regulatory compliances in Australia that drone operators must adhere to in-order to meet the system requirements of the Soar platform.

2.8 Intellectual Property

Soar is presently considering embarking primarily on a "first mover" strategy to protect the software platform. Reliance will be placed on the reputation of the Soar name and the advantage of the SkySponsor and SkyBounty functionality to ensure that user's consider the Soar software platform as the destination of choice for either monetising or obtaining drone content.

As a supplement to this strategy, Soar has initiated steps to obtain trademark protection for both the Soar and SkyBounty marks in the home market. International protection under the Madrid Protocol for both marks has been investigated and a formal protective strategy is presently under consideration by Soar.

Soar is adopting the position that copyright in all user-generated content provided to the platform shall remain owned by the content provider. Furthermore, at this time, Soar is not considering requiring customers to provide any form of exclusive license to user-generated content. Customers will, however, be required to provide normal warranties and indemnities regarding ownership of such user-generated content and infringement of third party intellectual property rights.

3. Go to Market Strategy

Soar will be marketing to both drone operators and drone content consumers. The go to market strategy will be addressing all parts of the drone value chain from drone manufacturers and suppliers to end user service providers. More detail on the structure of the drone value chain can be found in Appendix B.

Soar has planned five steps to seeding the marketplace and stimulation content consumption. These five steps are:

1. On-boarding of commercial drone operators
2. On-boarding of enthusiasts via a variety of channels
3. Partnerships with drone hardware and software providers
4. Partnerships with value-added service providers
5. SKYM token distribution to major content consumers such as media, mining, tourism, agriculture, local government etc.

Each of these stages targets key segments of the value chain and an overview of each of these stages is set out below.

3.1 Commercial Drone Operators

Commercial drone operators will be the first market segment that Soar will approach to seed the marketplace platform as they are the most likely to have repositories of drone content that are underutilised and can be further monetised. In addition, with the regulatory environment in many countries, they will be the only drone users who are legally allowed to commercially sell drone content.

Soar has already on-boarded approximately 450 commercial drone operators globally; each of these has on average 70 GB of drone content they are willing to market through the Soar platform. These commercial drone operators have been recruited through pre-existing relationships.

The commercial drone operator user base will continue to expand through:

- Drone conferences and trade exhibitions;
- Engaging drone focused member organisations;
- Media focused on the professional drone operator segment; and
- Pre-existing relationships at the board and senior advisory level.

3.2 Drone Enthusiasts

Drone enthusiasts are a secondary market for Soar as, while they are not legally able to sell drone content, they are the most likely to have the potential to convert from a hobby enthusiast to a commercial operator given the right financial incentives. The regulatory and financial barriers for hobbyists to obtain commercial licenses to capture drone content are continually falling, making the economic incentives to commercialise drone content greater. By creating an easy access channel for sales and distribution of drone content, Soar removes the final barrier for many of these enthusiasts to pursue commercial returns for their drone content. Unlocking this segment as content source has the potential to greatly increase content availability through Soar and provide a critical mass for seeding the future super-map protocol.

Soar will be taking a multi-channel approach to making enthusiasts aware of the potential of the Soar marketplace as a mechanism for drone content sale outside of the traditional fee-for-service model. The channels which Soar will utilise include:

- Twitter;
- Instagram;
- Drone focused online media; and
- Sponsorship of drone related events focusing on the enthusiast market.

3.3 Hardware & Software Providers

Creating marketing alliances with hardware and software providers have the potential to open additional channels to reach potential Soar users as well as providing opportunities that will create benefits for Soar users, the provider and Soar. Examples of the possible opportunities of these alliances include:

- A drone manufacturer enabling a direct upload of content to the Soar marketplace through OEM software and hardware ; and
- Enabling easy and seamless cloud storage capabilities for SkySponsors and users that integrates directly with the Soar platform.

These alliances with drone hardware and software providers will be approached in a traditional B2B relationship based commercial approaches. Soar is currently in discussions with a number of leading global brands in this space to implement a range of alliance opportunities.

3.4 Value-added Services

The potential to offer value added services for Soar users will provide similar benefits and potential as that for developing alliances with software and hardware suppliers. Examples of the value-added services Soar might incorporate from alliance partners into an offering for users includes:

- Offering users 'pay as you fly' insurance for drone operators, reducing the insurance overhead for commercial content capture; and
- Allowing users to access hyper-localised weather feeds and flight conditions which will assist in improving flight planning and operational performance.

Approaches to building these alliances will be essentially the same as that for hardware and software alliances. Soar is currently pursuing a number of these value-added service opportunities with global leaders to create compelling offer to drone operators. The development of new alliances will be continuous and will be pursued as new opportunities are identified.

3.5 Large Content Consumers

Activities bringing large content consumers on to the Soar platform will be directed to stimulate the demand side of the marketplace equation. Demonstrating the opportunity to easily and cost-effectively acquire drone content through Soar to influential large content consumers will build increasing confidence in the Soar marketplace. For drone operators, it will show them the potential revenue opportunities for the right type of content. Soar, by selecting key influencer brands, will signal to the influencer's market competitors the opportunity that the new approach to sourcing content offered by Soar is a viable way to acquire content. Furthermore, on-boarding these market influencers on to Soar has the potential to positively impact the uptake of goods

and services from alliance partners through the positive association of brands involved with the Soar platform.

Soar will identify the key influencers across a range of sectors that it wishes to engage as key content consumers. Approaches to on-board this user group will be pursued through a number of pre-existing relationships that Soar has at senior levels across a range of these organisations.

4. The Revenue Model

The revenue model for Soar has multiple streams, some of which will not be initially introduced with the start of the platform but will be introduced as the Soar platform evolves. These multiple revenue sources will ensure the longevity of the Soar platform and increase the utility and attractiveness for users. The multiple revenue models are:

- Commission model;
- Product differentiation model;
- Integrated services model; and
- Content marketing model

4.1 Commission Model

The Soar platform will initially generate revenue from commission-based sales of drone content and value-added services which will be disclosed at a later time. Although the rate of commission has not been determined, it will be in line with common industry rates, without creating a price barrier for selling content on the Soar platform.

The payment of commissions will be done via SKYM tokens as part of the transaction and will include those completed via both the SkyBounty and SkySponsor process models.

4.2 Product Differentiation Model

The Product Differentiation model focuses on providing a value-added solution for users through the supply of higher quality and specialised services including the editing and processing of drone content. Preprocessing is a common industry practice for businesses supplying traditional mapping and imagery. Higher value content will command a higher price but it has greater value and convenience for end users. This will increase the price and will be incorporated in the market price calculations (see Section 2.3)

Examples of this model include the following:

- High vs low-resolution imagery, the clearer and higher resolution the image is, the better price it will command in the market. (See Figures 17.1 - 17.2)

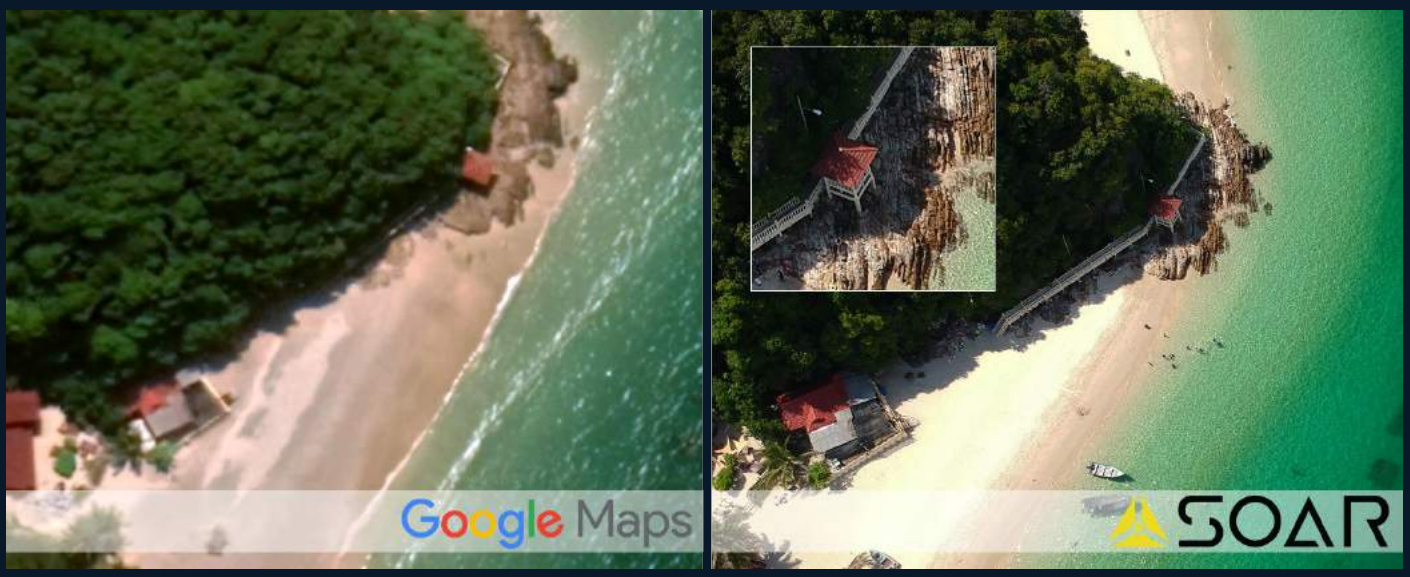

Figure 17.1: Comparison of high and low-resolution photographs of the Soar platform. (Source: Pexel)

Figure 17.2: Comparison of high and low-resolution photographs of the Soar platform. (Source: Pexel)

- Age of the data: As content on Soar will be dynamic and temporal, content providers can choose whether to place a premium on the dates in which the content was created.
- Image processing such as post-processing or colour balancing. Unprocessed content such as raw imagery is sold at a lower value as it may require additional processing by the purchaser. Content purchasers may then import the unprocessed content into content packages such as Adobe Photoshop or Premier for additional post-processing.
- Specialist data capture using sensors such as Lidar, thermal or multispectral images will also attract a premium as it can be used for more niche applications. (See Figure 18).

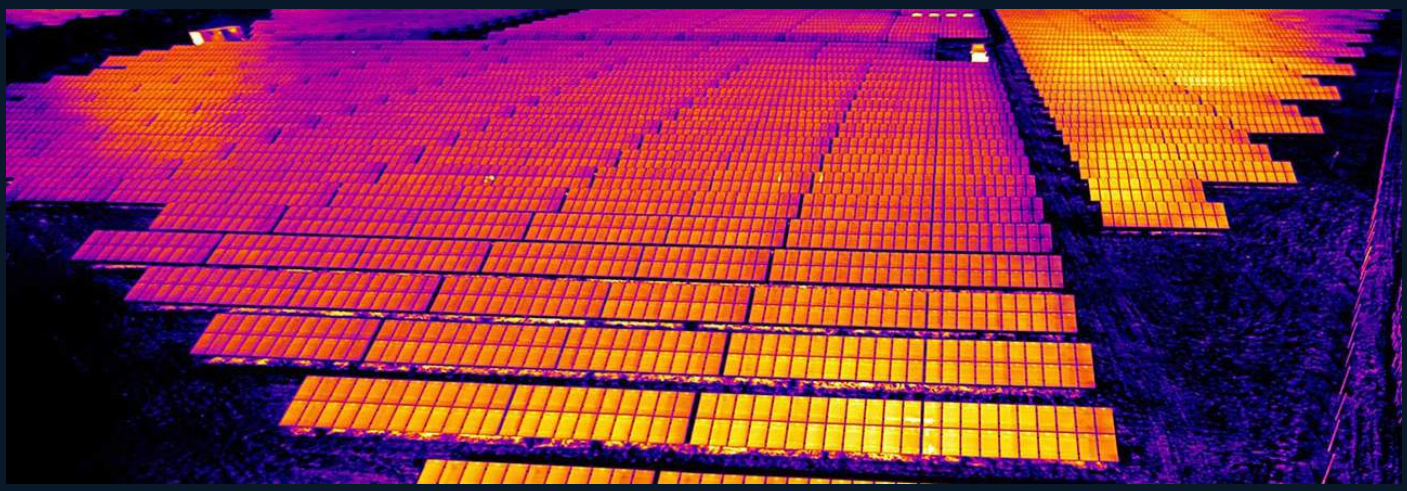

Figure 18: An example of night time thermal imagery. (Source: Drone Survey India)

4.3 Integrated Services Model

The greater geospatial, mapping and image processing industry has increasing abilities to provide niche post-processing services. Often, these technologies are however either locked away behind closed doors, created for one use purposes or are often embedded into alternative frameworks which do not allow them to be used in a democratised fashion. Essentially, there is a lot of great technology that never sees the light of day - the integrated services model seeks to fix this problem.

The Integrated Services model will allow the opening of the Soar API to 3rd parties allowing them to 'vend-in' their own technology suites to be applied to data and content that exists on

Soar. This will effectively open up a 'Mapping App Store' of sorts whereby professionals and hobbyists can reach a global audience of users.

Examples of these integrated services may include:

- Object-based image analysis algorithms that can assist with counting objects captured within a drone image such as cars, trees and even livestock. (See Figure 19)
- AI bots that can determine specific characteristics in the image such as potential areas of soil erosion on farmland, flash flooding on major roads and homes prone to severe weather damage in dense urban centres.

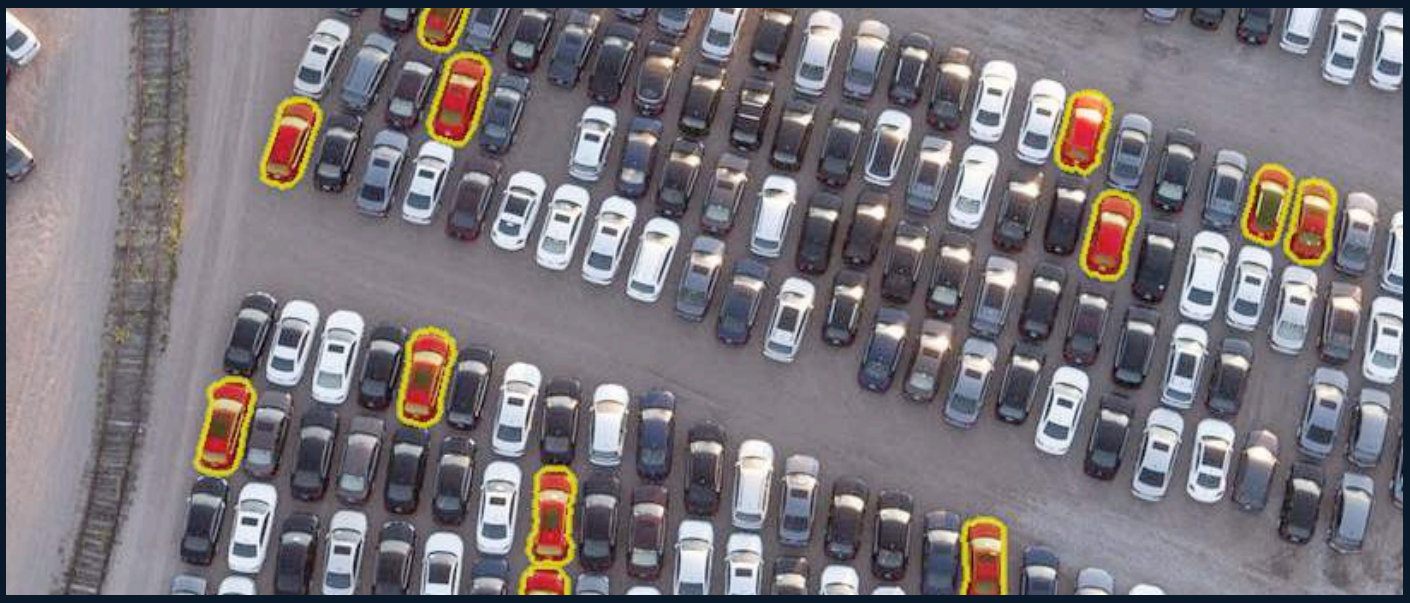

Figure 19: An example of automated object classification for parked cars within a geofenced area. (Source: Takor Group)

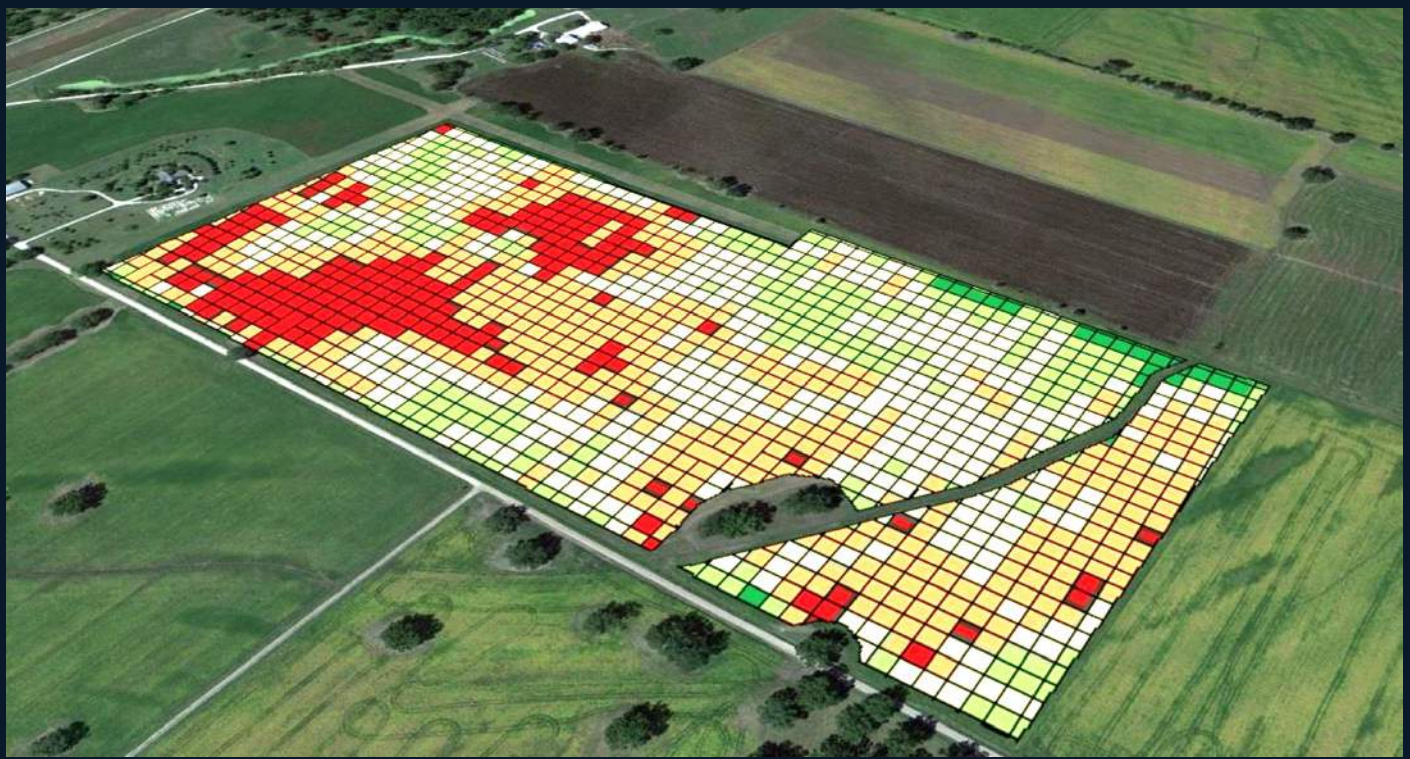

Figure 20: Vegetation analysis determining plant health in agriculture is an example of Soar's integrated service model. (Source: Agrobotix)

- Spectral analysis of drone content to provide exact classification of vegetation health and yield for a range of crops such as rice, maize, fruit, and others. The added benefit of spectral analysis is that it can be applied in a hyper-local setting on a per hectare basis - further assisting farmers. (See Figure 20 on the previous page)

An additional benefit of the integrated services 'Mapping App Store' model, is that because the Soar platform will sit on a blockchain, the metadata for not only each transaction, but for each pixel can be recorded and referenced. This adds an incredible dimension to the way content can be stored, analysed, shared and further analysed in a parallel setting - all adding to the rapidly expanding knowledge base across the Soar platform.

Although the specifics behind this commercial opportunity are yet to be disclosed, Soar has already started talks with several world leading technology partners which will assist in the initial roll-out plan for adding on-platform services for users.

4.4 Content Marketing Model

The Content Marketing model allows for the building of strategic content communities where drone content can be fixed to a specific time and location. This means drone content can be catalogued and distributed rapidly and cheaply at scale due to Soar's decentralised architecture. This model focuses on creating marketing drone content access for news, media and entertainment providers who can provide authentic and verifiable drone content to end consumers. With verification, end-consumers are more likely to trust the content and fact check to prevent 'fake news'.

Soar will monetise this revenue stream through the implementation of:
- Paid branding and marketing opportunities for media channels hosting drone content on Soar;
- Premium access for specialised services, customised dashboards and functionality for content marketers;
- Customised, premium SkyBounty opportunities; and
- Automated verification services for drone content hosted on Soar.

An example of the content marketing end-use of drone content can be seen in Figure 21.

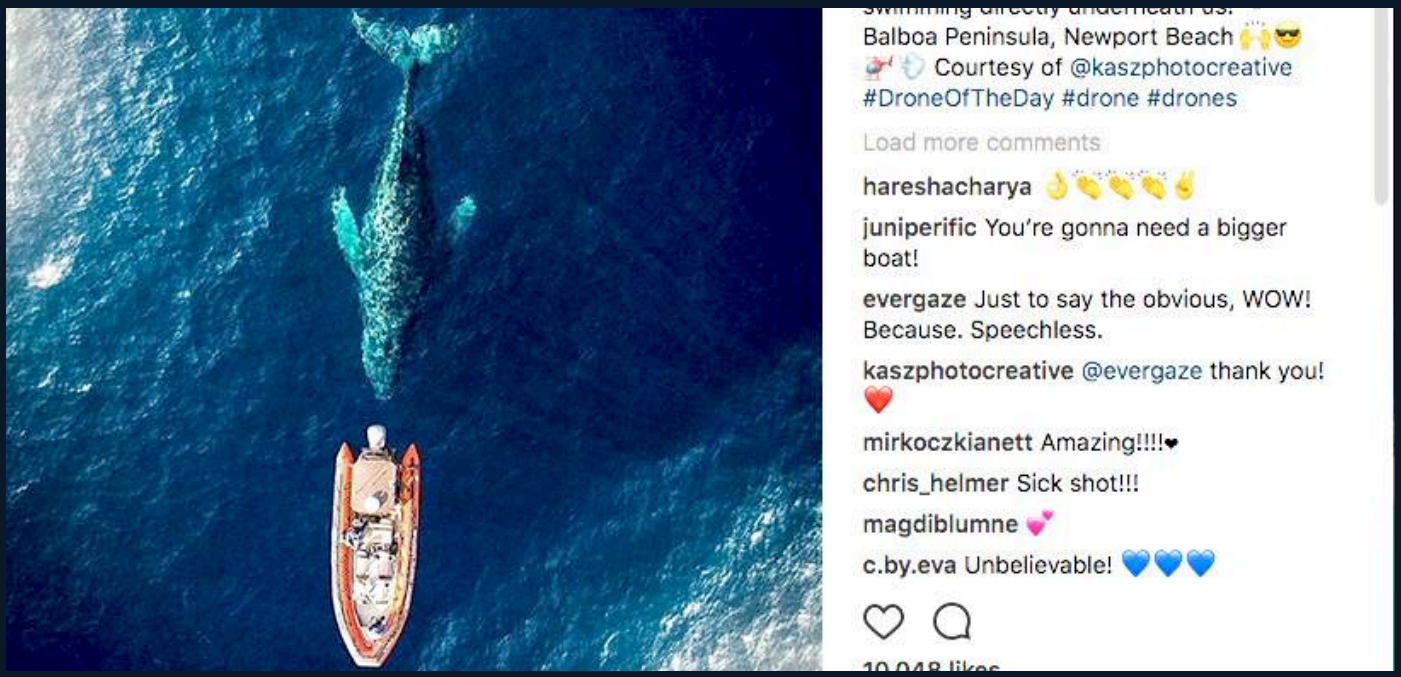

Figure 21: Soar's Content Marketing model allows for trusted and verifiable drone image capture. (Source: Droneoftheday / Instagram)

5. End State: The Super-Map

The Soar team has been working tirelessly towards the goal of **democratising geospatial technology** and views the Soar platform as an important stepping stone in that story. Beyond the initial scope outlined in this document there is a range of ideas and opportunities to broaden the functionality of the Soar platform.

As the volume of content increases, the Soar platform organically grows into a compelling example of **dynamic mapping**. That is a map that grows and changes over time to reflect the ever-changing nature of our world. Beyond this, the coupling of drones and dynamic mapping would allow near real time intelligence for managing situations in progress such as natural disasters, security response, events management and construction.

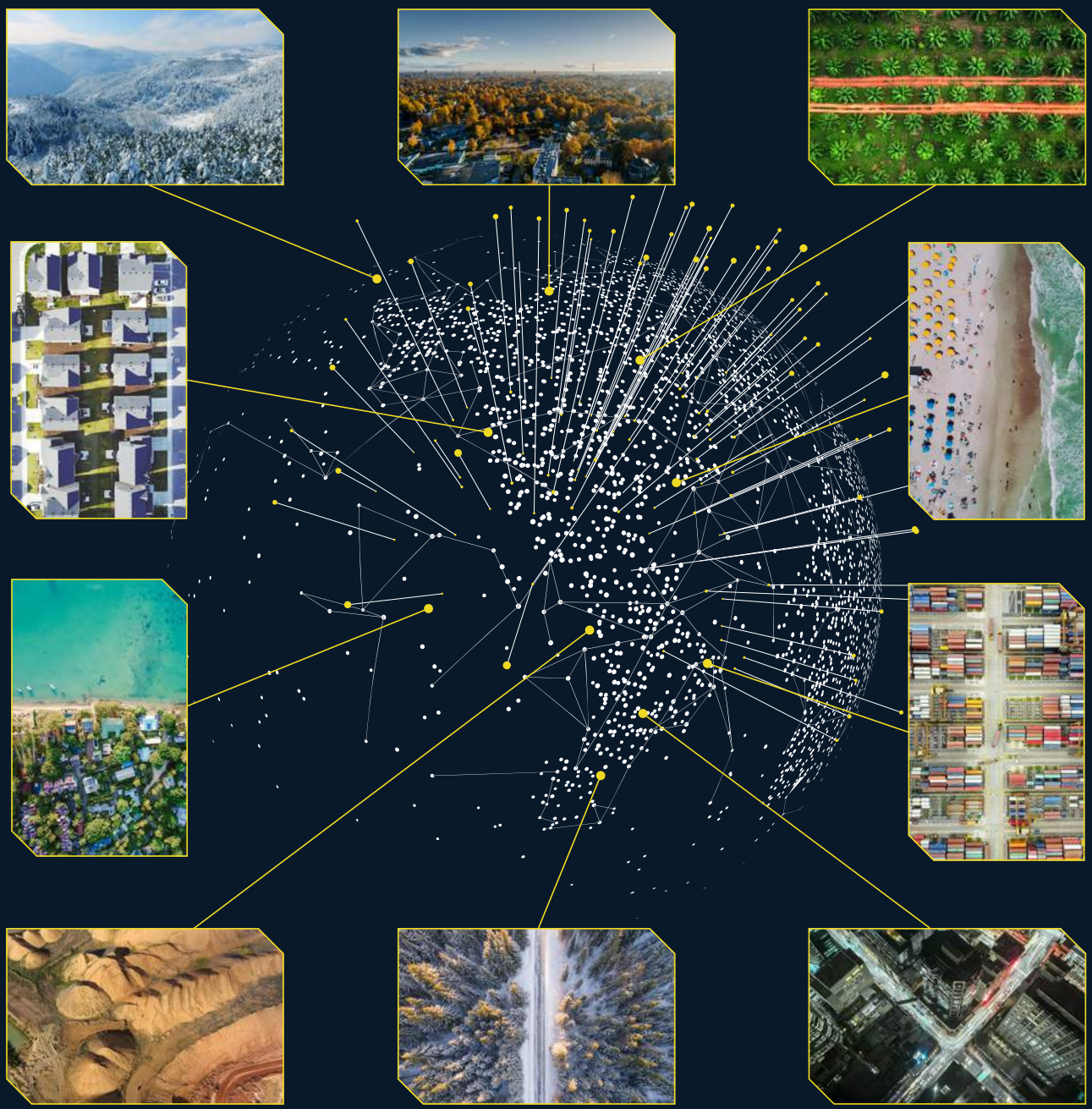

Figure 22: The end-state Super-map schematic showing a dynamic, crowdsourced map of the world with compelling product types for almost all uses using blockchain technology.

Developing a Soar protocol allows us to address the geospatial functionality absent in existing blockchain protocols and power other location based blockchain applications. The Soar protocol would be able to:

- Store large volume datasets on the blockchain such as video and images;
- Natively handle spatial data types such as coordinates, polylines and polygons;
- Efficiently perform geospatial queries;
- Interact with industry standard geospatial databases and file formats; and
- Expose a map tiling service for use in web and mobile applications.

Integrating the Soar platform with an **existing geospatial application** developed by Takor Group would open up new markets for content consumption and give individuals and organisations who collect and manage data about our world access to an up to date birds eye view of their area of interest.

6. The Token Generation Event (TGE)

6.1 SKYM Token

In order to grow the Soar platform, we will be conducting a token generation event (TGE). The SKYM token will be compliant with the ERC20 standard and distributed on the Ethereum blockchain. The SKYM token will also be distributed among users of the platform for the purpose of seeding the Soar platform with both drone content providers, as well as consumers.

As previously noted, the SKYM token is a utility token that provides access to a wide range of crowd sourced, and sponsored drone content. As the Soar platform evolves, SKYM will also allow access to a range of services delivered through Soar such as those planned for the Mapping App Store and the content marketing channels. Furthermore, eligibility for becoming a SkySponsor requires holding a stake in SKYM tokens to ensure that SkySponsors are vested in the health of the platform.

Soar emphasises that the SKYM token does not represent:

- Any security or interest in Soar, its related entities or any other assets or property; or
- Any debt owed or payable.

6.2 SKYM Token Crowdsale

There will only ever be 350,000,000 SKYM tokens generated of which 130,000,000 will be distributed in the private and public crowdsale raising a hard cap USD equivalent of $19.5M. The fullbreakdown of the TGE is outlined in Table 1 below. Please note that the following TGE structure is subject to change due to demand and may be changed at the end of the pre-sale period.

	SKYMs	**%**
TEAM	43,000,000	12.3%
ECOSYSTEM	68,000,000	19.4%
COMMUNITY	54,000,000	15.4%
ADVISORS	7,000,000	2.0%
PARTNERSHIPS	48,000,000	13.7%
PRIVATE SALE @ 15c	115,000,000	32.9%
PUBLIC SALE @ 20c	15,000,000	4.3%
	350,000,000	**100%**
HARDCAP	$19,500,000	
PRE-SALE RAISE	$17,250,000	
PUBLIC SALE	$2,250,000	
MARKET CAP LISTING	$8,200,000	
TOTAL TOKEN VALUATION	$70,000,000	

Table 1: Structure of the Soar TGE.

6.3 Use Of Funds

The initial plan for the use of funds raised during pre-sale and TGE is shown in Figure 23 below.

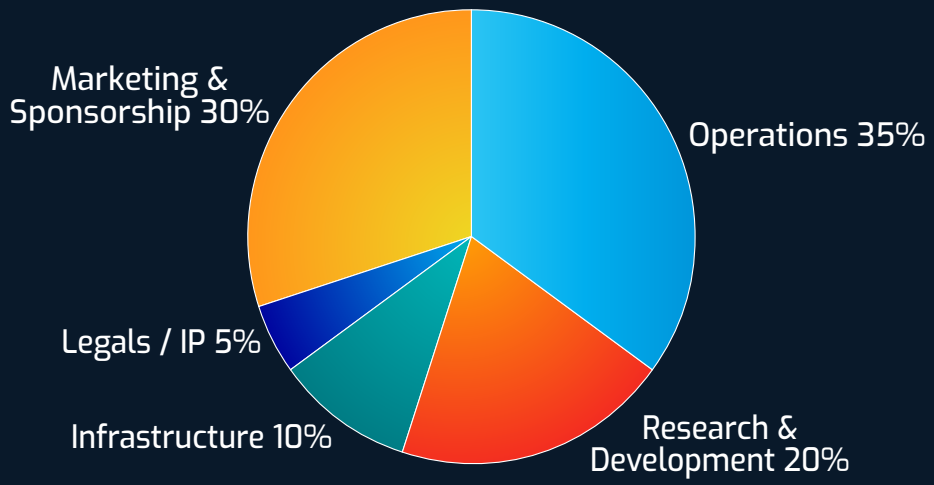

Figure 23: Planned use of the Soar funds.

6.4 Roadmap

Soar will be undertaking ongoing development prior to and following the TGE. This development will focus on the initial launch of the Soar Stage 1 platform and be followed by the development of additional functionality to enable value creation opportunities for Soar users. Stage 2 of the Soar platform will release the super-map protocol accompanied by a global roll-out and roadshow in conjunction with key partners. The following table outlines the key timing of these milestones in further detail.

2017	
AUGUST	Concept validation and release from military use
NOVEMBER	Incorporation of Soar
DECEMBER	Initiation of Test Net build
2018	
FEBRUARY	First presentation of Soar at 'TPE Blockchain Forum' in Taiwan
APRIL	Formal release of Soar TGE
MAY	Whitepaper release
JULY	Finalisation of Soar TGE
AUGUST	Soar (beta) release of Stage 1
SEPTEMBER	Official release of Soar Stage 1 to Main Net
OCTOBER - NOVEMBER	Global roadshow
DECEMBER	Mobile app release
2019	
JANUARY	Expansion of Soar to multi-language support
APRIL	Soar (beta) release of Stage 2 'super-map'
MAY	Official release of Stage 2 'super-map'
JULY - AUGUST	Global roadshow

Table 2: Soar platform roadmap.

7. The Team

7.1 The Core Team

Amir Farhand
CEO & Founder

Neil Prentice
Blockchain & Commercialisation

Chris Lowe
Lead Blockchain Scientist

Willem Swanepoel
Lead Mobile Developer

Marek Tlačbaba
Blockchain Developer

Alasdair Penman
Blockchain Developer

Charlie Caruso
CMO
Head of Global Marketing & Branding

Dan Anderson
UX & Graphic Designer

The Team

7.2 Advisors / Board Members

Phil Carulli
Non-Executive Director
Director - Optima Partners Accountants

Colonel James Rhetta
Retired US Army
Signals Processing Expert

Guy Perkins
Non-Executive Director
Sales Director - Spookfish Aerial Imaging

Craig Baldner
Retired US Army
Communications Expert

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Glossary

CAGR	Compound annual growth rate
ETH	Ethereum
EXIF	Exchangeable image file
FAA	Federal Aviation Administration
FPS	Frames per second
GDP	Gross Domestic Product
GPS	Global Positioning System
ICO	Initial Coin Offering
SKYM	SkyMap Tokens
UI	User Interface
UX	User Experience

Appendix A - Types of images suitable for use in the Soar platform

Soar can deal with a range of different content types that are accessed through the Soar platform. As Soar will not be hosting the content directly, users can upload almost limitless types of drone content files for:

Still imagery at any viewing angle;

- Video content at different resolutions;
- Aerial maps giving a bird's eye view of the ground; and
- Specialised content such as multispectral, lidar and thermal imagery.

Each of type of content will have a different file container types or compression algorithm associated with the file and, depending on the file type it also collects different types of metadata associated with the content. The file type for the content has the most importance to the end-user and may limit the possible use of the content without further processing.

Content capture capabilities is entirely dependent on the camera or sensor used to capture the data and the resolution of the camera and most cameras have the capability of capturing both still and video content.

Drone Content
When drone content is captured, the content itself (image data) is stored in a file container which, at it simplest, describes how different elements of data and metadata coexist in a computer file. File containers vary based on the type of content that is stored within them and the metadata that is recorded about it. Depending on the user's choices and the type of content, the file containing the drone content can then be post-processed or directly uploaded to Soar.

Still Images
The two most common formats available for still images are JPG and RAW. Most cameras allow users to select the single format captor and others can capture both types simultaneously. The main difference between the two formats is that:

- RAW is an uncompressed format and maintains the most quality and fidelity making it the preferred format where images will be post-processed. However, it creates large files that are significantly larger than the same image saved as a JPG.
- JPG is a 'lossy' compression format that is more suitable for rapid capture and dissemination without post processing. The use of the JPG compression algorithm means that the file size of the final image is smaller, but some detail and colour effects are lost through the compression process.

Video
Video content can come in multiple file formats. The format in which video is recorded dependends on the camera and if it has the option to switch between file formats. Unlike still images, it is rare that video content is recorded in an uncompressed format due to the file size of uncompressed video. The most common video formats, MP4 and MOV, do not differ in quality as the video data compression algorithm used for both of these formats is the industry standard H.264 codec. There are many other video file format containers but these are not commonly used in drone content capture. However, the format is important for the intended consumption endpoint e.g web, mobile, streaming etc.

Video content can be captured at different resolutions depending on the capabilities of the camera e.g SD (720p), HD(1080p) or 4K. Many cameras allow the selection of both resolution

and capture frame rate (24 fps for PAL, 30 fps for NTSC and higher frame rates for slow motion capture) in which the video content will be captured depending on the needs of the user. The use of higher frame rates may limit the capture resolution based on the camera's capabilities.

Aerial Maps
Aerial maps captured by drone operators are processed before being uploaded to Soar. Pre-processing is a requirement of the mapping process as aerial maps are created by stitching together from multiple still image files. (see Figure 9)

Aerial maps are be available as both 2D and 3D content, depending on the nature of capture and the processing methods undertaken. These come in a range of file formats depending on the intended purpose of the aerial map and the nature of the post-processing of the images.

Many maps will have some form of compression applied to the image but lossless compression algorithms are available. The type of map (e.g. 2D vs. 3D) , and the needs of the end user will dictate the file format for the map.

Specialised
The Soar platform is also able to deal with other specialised content formats such as:

- Point-cloud files from Lidar;
- Radiometric data from thermal imaging; and
- Multi-spectral images.

The above is not an exhaustive list of the of the possible speciality content types, different types of content have speciality file containers that are dictated by the data and its use case. For example, thermal images have a specialised JPG file which also contains temperature data for each pixel in the image. This temperature data can be used for analytical purposes using specialised software but can also be viewed normally as a JPG file.

Appendix B - Drone Value Chain

A value chain highlights the points at which there is an opportunity to create or add economic value in a series of transactions between participants in a market place. The drone value chain t below highlights the key points of the value chain where Soar can add economic value to drone users and the consumers of drone content. The value chain should not be considered a strictly linear set of steps or activities within the market, for example the supplier of technologies for OEM drone manufacturers also are in the market to provide aftermarket modifications and payloads for drone service operators as well as often providing maintenance services for drones.

The value chain presented below highlights the key activities within the drone value chain that will benefit from the introduction of the Soar platform.

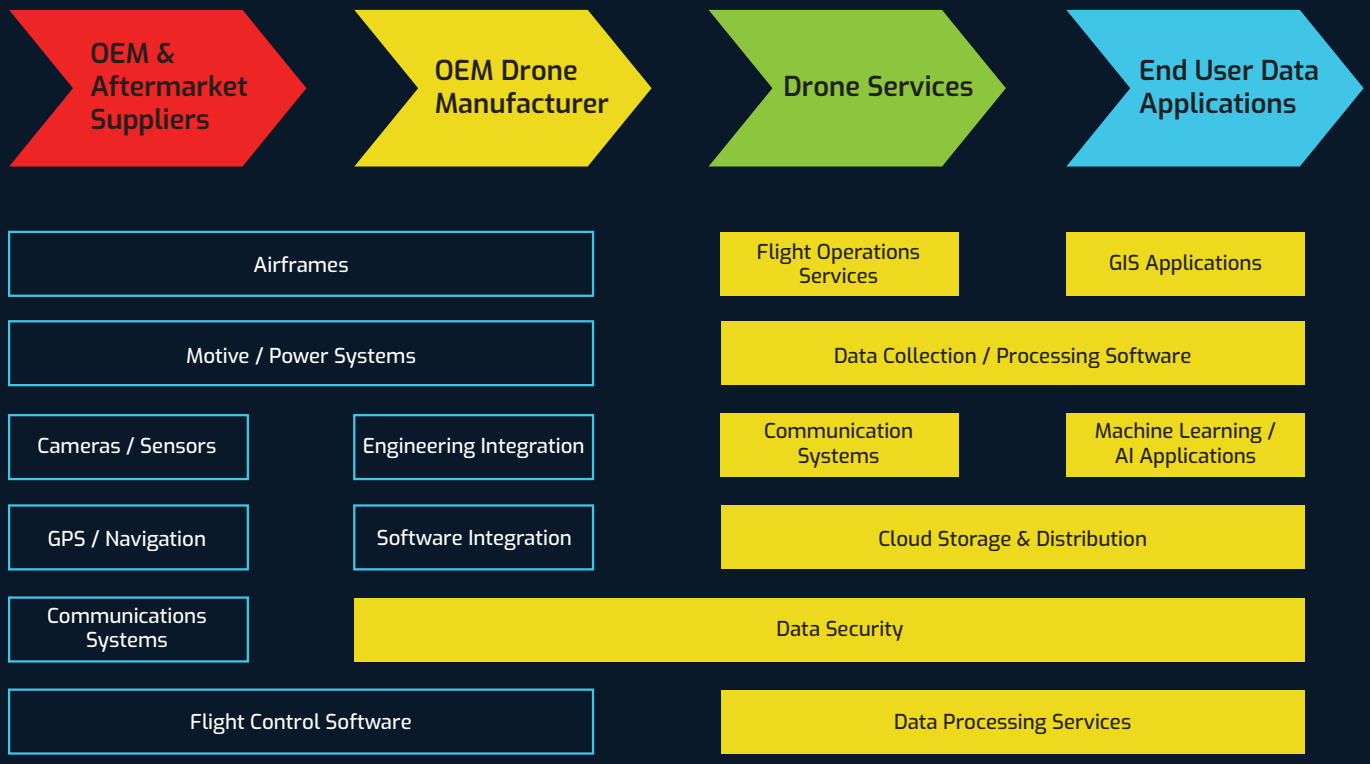

Figure 24: The drone value chain, highlighting the sectors impacted by the launch of the Soar platform.

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