

# telescopia



## White Paper

*Draft V 0.2.8*

01-10-2018

# Table of Contents

Introduction	7
Mission Statement	7
Vision Statement	7
Observation Sessions	8
Object Observation Session	8
Private Observation Session	8
Group Observation Session	9
SkyTour	10
Sessions Customization	12
Requests During Session	13
Requests After Session	14
Sessions Summary	15
Peer to Peer and Providers	15
Quality of Service	15
GeoMap   Geographic and Weather Map	16
Usage Throughout Telescopia Modules	16
SkyMap   Celestial 360° Map	16
Objects Database	17
SkyMap Usage	17
Mixed Reality SkyMap	18
Telescope Booking	18
Object Observation	18
Private and Group Sessions	18
Payment	19
Provider	19
Astrophotography	19
Capturing Process	19

Super Resolution Astrophotography	20
Providers	21
Operational Requirements	21
Holdings	22
Validation	22
Provider Service Reliability Assurance	23
Day to Day Operations	23
Add-on Services	24
Provider Roles and Profile	24
Provider Accounting	25
Provider Ranking System	25
Expert Consultations	25
Lecture Rooms	26
Knowledge Center	27
Sky Object Profile	27
Telescope Profile	27
Accessory Profile	27
Teoscopia Market Place	28
Listing and Deals	28
Trade	28
Sales Listings	28
Auction	28
Telescope Builder	29
Buyer Consultation	29
Used Equipments	29
Pricing Plan	29
Consumer Segmentation	29
Pricing Policy	30
Commission Policy	31
Teoscopia Commission	31
Provider Session Payable	31
Market Place Commission	31

System Design	32
System Architecture	33
Operational Requirements	33
Daily Requirements	33
Seasonal Requirements	34
Operation Overview	34
Telescope Control	35
Telescope Mount Control Protocols	36
Telescope Connection	36
Error Handling and Correction	36
Communication	37
Telesapia Guiding System	37
Quality of Service	38
Imaging and Video Capture	38
Supported Devices	39
Camera Connection	39
Communication	39
Image and Video Post Processing	40
Object Database Catalogs	40
Technical Workflows   Pre Session	41
Object Observation Session	41
Private Session	43
Group Session	45
SkyTour	47
Session Election   Provider	49
Computation Components	49
Results and Conditions	51
Session Election   Server	52
Computation Components	52
Results and Conditions	53
Session Election   Narrator	53
Computation Components	54

Results and Conditions .....	54
Session Making	55
Utilization	56
Decentralized Core	57
Telescopia Blockchain.....	57
Decentralized Database .....	57
Compression .....	57
Decentralized Infrastructure.....	58
Timeline Plan	60
Development Timeline .....	60
Release Timeline .....	61
Provider Economics	63
Provider's Session Revenue .....	64
Payback Period.....	64
Cyrus Token	65
Use Cases .....	65
Token Price Support .....	65
Token Sale and Leasing .....	66
Reserve Management .....	66
Tokens and Fiat Money Movements .....	66
Cyrus Token Emission .....	67
ICO Terms and Conditions .....	68
Cyrus Value Projection and Holder Privileges .....	68
Reserve Fund Usage .....	71
Reserve Fund Resources .....	72
CYRS Price Forecast.....	72
Financial Model	75
Hard Capped Schema .....	76
Soft Capped Schema .....	77
Pre-ICO Financial Plan .....	78
Marketing Plan	80
Consumer Groups .....	80

Community Management .....	82
What Makes Telescopia Attractive.....	83
Brand Marketing .....	83
Social Media Networks Advertisement .....	83
Messengers Advertisement .....	84
Contextual Advertisement .....	84
ICO Lists .....	84
Blockchain and Cryptocurrency Media.....	84
Meetups, Conferences and Exhibitions .....	84
Venture Funds .....	85
Cryptocurrency Exchanges	85
Telescopia Team	85

# Introduction

All of us, irrespective the age, have wondered once what lies beyond the sky, as our technological bounds evolves the barrier between us and the cosmos gets thinner and thinner.

We always look up to the astronomers who discover new space objects every day and dream of becoming one of them, one might use the internet to search and explore the universe, or even use the an augmented reality mobile application that bring the planets in front of you, however the urge of exploration is missing and the dream of traversing the universe in real live feed is missing. From here Telescopia emerged as an idea that developed over the past 10 years, to become a reliable plan now.

Telescopia offers unprecedeted multilingual live telescope experience that encapsulates a vast network of services offered in one bundle containing: live control, video feed, consultants, tour guides, professional image capturing (astrophotography), infra-red astronomy, lecture rooms, mixed reality experience throughout all services and a telescope marketplace.

We are part of this universe; we are in this universe, but perhaps more important than both of those facts, is that the universe is in us.

Neil deGrasse Tyson

Telescopia operates in a peer to peer fashion where all services are provided from a network of telescope owners (provider). The providers are managed in democratic approach where all services are handled based on an election algorithm to effectively normalize the earnings among Telescopia providers.

Telescopia is an intellectual property of Pylux Solutions, LLC.

## Mission Statement

Introduce the international and cryptocurrency world with a new lens to our vast universe; which is consistently perceived as low cost and high quality alternative to traditional telescopes; Opening greater educational horizon that enlighten the students and researchers all over the world.

## Vision Statement

Our vision is to lead the telescope streaming industry globally, plant landmarks with the innovative technologies we offer, revolutionize the industry by introducing space telescope streaming technology, We will not settle for anything less than excellence.

# Observation Sessions

To accommodate the infinite usage of Telescopia, there are multiple varieties of observation sessions to suite the desire of our customers.

## Object Observation Session

One celestial object observation session without telescope control, especially tailored for a general observers, explorers, event driven consumers, or photographers.

The session allows the users to observe one celestial object of interest without the need to manually direct the telescope to it, however the user possess no control over the telescope operation as it is automatically handled by Telescopia during this session.

### Usage

Using Telescopia SkyMap users can select the observation object before starting the session, however they cannot change it once the session has started.

The user has to make the session payment in advance, the payment can be done either in CYRS or in any fiat currency plus the CYRS exchange fees.



Once the user confirms and pays for the session, Telescopia automatically search and elect a provider, narrator and server according to the selected options then forms a new object observation group (capped to 10 users) before starting the session or the user joins a group formulating.

Telescopia then guide the telescope towards the target celestial object position through Telescopia software and open a telescope video stream to the user, while a narrator explains the observation.

## Private Observation Session

Fully private telescope experience complete with exclusive controls, interchangeable accessories, navigation assistance, tour guiding and much more, that is tailored for researchers, amateur and professional astronomers, students and teachers.

### Telescope Control

The user operates the telescope from the DAPP using the following methods:

- a. Manual coordinates and/or directions.
- b. SkyMap search and go functionality with automatic guiding and tracking.
- c. Pass the control to a consultant or tour guide.
- d. Define a SkyMap path before starting the session then navigate through the path's object within the session using next and previous object go to with automatic guiding and tracking.



## Group Observation Session

Fully private group experience with controls, realtime interchangeable accessories, long exposure astrophotography and much more, specially tailored for researchers, amateur and professional astronomers, students and teachers.

Just like the private session Telesopia offers a unique experience for its user base, as a fully controlled telescope is present in a group setting.

A user starts a new group session and choose the equipment he require then invite the attendees via e-mail or any messaging platform, users can only join a group with an attendance ticket.

## Group Administration

In group session an administrator is in charge of all the operations during the session time.

The group admin have full control over the telescope, however he or she can promote a user to be in control of the telescope, in any case only one user can have the control in any given time.

Payments for group session can be done by the group admin or via bill splitting among the group attendees, before the session starts.

In this session the group admin can operate the telescope from the DAPP interface using:

- a. Manual coordinates and/or directions.
- b. SkyMap search and go functionality with automatic tracking and guiding.
- c. Define a SkyMap path before starting the session then navigate through the path's object within the session using next and previous object go to with automatic tracking and guiding.
- d. Request accessories to be installed from the telescope provider, before and during the session.



## Group Add-on Services

A lecture room feature will be available to group session that includes:

- a. Whiteboard complete with mockup and external references imports for the lecturer.
- b. Telescope view with mockup for lecturers to explain their point clearly.
- c. In mixed reality group session the lecture room will be rendered completely with video conferencing capability.
- d. Request a record with the lecture room included.

## SkyTour

Journey through the vast universe with Telescopia, developed especially for general observers, explorers, students and teachers.

The tour's objects are predefined, however not fixed for example a solar system SkyTour consists of the 8 planets, most of their moons and the sun.

## Management

The list of available tours will be displayed to the user and will be refreshed and updated daily to accommodate new tour requests and open new possibilities.

Example Tours:

- a. Solar System Tour.
- b. Asteroids Tour.
- c. Man Made Objects Tour.
- d. Stars Tour.
- e. Messier Tour.



Before the tour starts the users will be presented with a SkyMap containing the tour's celestial objects and path, with detailed information for each objective.

All tours are automatically controlled and managed by Telescopia, thus users possess no control over the tour's objectives or duration, as the SkyTour is designed for the less experienced user as it automatically navigate the well known objects and create a learning path for the users.

A well trained tour guide will accompany the users through out the tour explaining its objectives and paths, he/she will communicate via the integrated VOIP and can answer the users inquires via chat and a detailed object information text shown throughout the journey.

Any streaming and/or recording of the tour is prohibited and if it may occur will be considered a violation of Telescopia copyrights.

SkyTour can be booked as private tour or group tour.

## Private Tour

A fully private SkyTour with all its features; The user will have the option to modify the observation time frame of objects and the option to plot a tour from scratch using the SkyMap.

Private tour can only be booked 1 hour ahead in order to be prepared by Telescopia.

The user will be charged with the entire amount of the tour.

## Group Tour

A group tour is designed for group of users that want to journey through the SkyTour together.

The group admin will have the same customization as in the private tour.

Group tour can only be booked 1 hour ahead in order to be prepared by Telescopia and will be held until all the attendees are ready.

The group will be charged with the entire amount of the tour.

## Pricing Bases

The tour prices varies and will be computed for each tour separately according to: time frame, objects count, accessories used, telescope quality.

## Providers

Providers are not allowed to participate in SkyTour, as it will be provided by Telescopia own telescopes.

## Mixed Reality Tour

The SkyTour will be available in mixed reality immersive experience, as the tour will be featured entirely in MR with live objects brought directly from the telescope optics to your devices.

## Technical Challenges

To achieve such a live tour within a time frame of 25 minutes, Telescopia will require multiple telescopes to be present and streaming simultaneously in realtime.

The telescopes will be reserved for the SkyTour after the telescope election process, furthermore the telescopes are controlled automatically by Telescopia.

## Sessions Customization

Users have multiple options to customize their Telescopia session experience before starting a new session if they choose to or trust in the choices made by Telescopia election algorithms which will select the best options to meet the session objectives. However some options are exclusive to group or private sessions.

Below are some of the customizable options.

### - Professional Consultant Request

The user may request a professional consultation service to be rented for a limited time within any of Telescopia sessions, the professional astronomer can communicate using voice over or live chat.

This option is customizable in: Object, Private, Group, Mixed Reality Private and Mixed Reality Group Sessions

### - Narrator Selection

The user can select a narrator from a list of elected narrators.

This option is customizable in: Private, Group, Mixed Reality Private and Mixed Reality Group Sessions

### - Location Selection

The user can select a location from a list of elected provider's locations that are automatically compiled to best suite the session objectives.

This option is customizable in: Private, Group, Mixed Reality Private and Mixed Reality Group Sessions

### - Quality Selection

The user can select the quality of the telescope optics from the list of compile provider's telescopes and the stream quality from a list of: 1080i, 1080p, 4K and 8K (Available only for Group Session).

This option is customizable in: Private, Group, Mixed Reality Private and Mixed Reality Group Sessions

## - Duration Selection

The session duration can be set ahead of the session, however the duration should be more than or equal to the session minimum duration listed above.

This option is customizable in: Object, Private, Group, Mixed Reality Private and Mixed Reality Group Sessions

## Requests During Session

During session all changes are handled via requests below are a list of all the features that are allowed to be changed during a session, with no extra charge for most requests.

Some requests may take time to execute which may effect heavily the session duration, however the session timer will be paused during some requests execution.

### - Astrophotography Capture Request

The user can request a small exposure astrophotography capture within all of Telescopia sessions, however this request is free for small exposures only that lasts less than  $\frac{1}{500}$  of a second, any longer

exposures are subject to a fee depending on the exposure time and is available for private and group sessions only and the session timer will be passed during the image capture.

This option is available within: Object, SkyTour, Private, Group, Mixed Reality SkyTour, Mixed Reality Private and Mixed Reality Group Sessions.

### - Tour Guide Request

The user may request a tour guide to accompany them throughout their adventure and help them to traverse our vast universe. This is a paid service and the session timer will not be paused during its execution.

This option is available within: Object, Private, Group, Mixed Reality Private and Mixed Reality Group Sessions.

### - Mixed Reality Experience Request

The user may request to change the session type to be in a mixed reality immersive session. This is a paid service depending on the session type and its MR counterpart price and the session timer will be paused during the execution of this request.

This option is available within: SkyTour, Private and Group Sessions.

### - Accessory Change Request

The user can request a telescope accessory to be changed to suit his/her needs, this request is free of charge and the session timer will be paused during the time it takes the provider to change the accessory.

This option is available within: Private, Group, Mixed Reality Private and Mixed Reality Group Sessions.

### - **Telescope Change Request**

The user can request to change the telescope used in the session, this operation will in turn change the session's provider, the user has to reason the request before it becomes valid. This request is free of charge and the session timer will be paused during the execution of this request.

This option is available within: Private, Group, Mixed Reality Private and Mixed Reality Group Sessions.

### - **Narrator Change Request**

The user can request to change the narrator of the session, the user has to reason the request before it becomes valid. This request is free of charge and the session timer will be paused during the execution of this request.

This option is available within: Private, Group, Mixed Reality Private and Mixed Reality Group Sessions.

### - **Server Change Request**

The user can request to change the server used to upstream the session, the user has to reason the request before it becomes valid. This request is free of charge and the session timer will be paused during the execution of this request.

This option is available within: Private, Group, Mixed Reality Private and Mixed Reality Group Sessions.

### - **Time Extension Request**

The user can extend the session time if he/she ran out of time.

This option is available within: Object, Private, Group, Mixed Reality Private and Mixed Reality Group Sessions.

### - **Session Pause Request**

The user can request to pause the session for an amount of time no longer than 5 minutes.

This option is available within: Private, Group, Mixed Reality Private and Mixed Reality Group Sessions.

## **Requests After Session**

## - User Review

The user is presented by a short review of his/her Telescopia experience, to better improve our services in the future.

## - Session Recording Request

After all Telescopia sessions the user can request a video recording; However this request is available only within 1 hour of the end of the session or the recording will be permanently deleted from Telescopia servers.

# Sessions Summary

Session Type	Users Count	Telescope Control	Objects Count	Average Duration
Object Observation	10 Users	N/A	1	15m
Private	1 User	Full	$\infty$	25m
Mixed Reality Private	1 User	Full	$\infty$	40m
Group	10 Users	With Group Admin	$\infty$	1h
Mixed Reality Group	10 Users	With Group Admin	$\infty$	1h
SkyTour	30 Users	Automated	Limited	25m
Mixed Reality SkyTour	30 Users	Automated	Limited	40m

## Peer to Peer and Providers

Telescopia will operate a network of providers that will be in a semi peer to peer fashion as the post and pre processing of sessions limits the P2P architecture; however we are very dedicated to our providers and will constantly work to improve our service and the provider ease of use.

## Quality of Service

We understand that not all providers will have cutting edge telescopes, optics, or accessories in their possession to offer for deep space sessions, SkyTour, or high end astrophotography.

To build our vast user base requirement and to ensure the best quality of service Telescopia will offer its own equipments to be available for SkyTour, astrophotography and Sessions, however Telescopia own equipments will also enter the election process with lower priority.

By offering high end equipments we open new opportunities to our providers, by expanding our user base and type.

# GeoMap I Geographic and Weather Map

The GeoMap illustrates a landscape features or body of water in addition to the elevation and weather forecasts; This information is vital to how Telescopia operate its algorithms to achieve high grade of quality and clarity, furthermore the GeoMap is deeply integrated into Telescopia.

Given a time and date the GeoMap is used alongside the SkyMap to locate an online telescope at a location with clear skies for the user in order to observe one or multiple objects in the space using one of Telescopia sessions.

Telescopia utilizes the GeoMap broad information for the providers to locate the best nearby location with high elevation, weather forecast and sky clarity to prepare and setup their telescopes.

For an experienced user the GeoMap can be used manually to search and locate a telescope around a specific location on earth.

## Usage Throughout Telescopia Modules

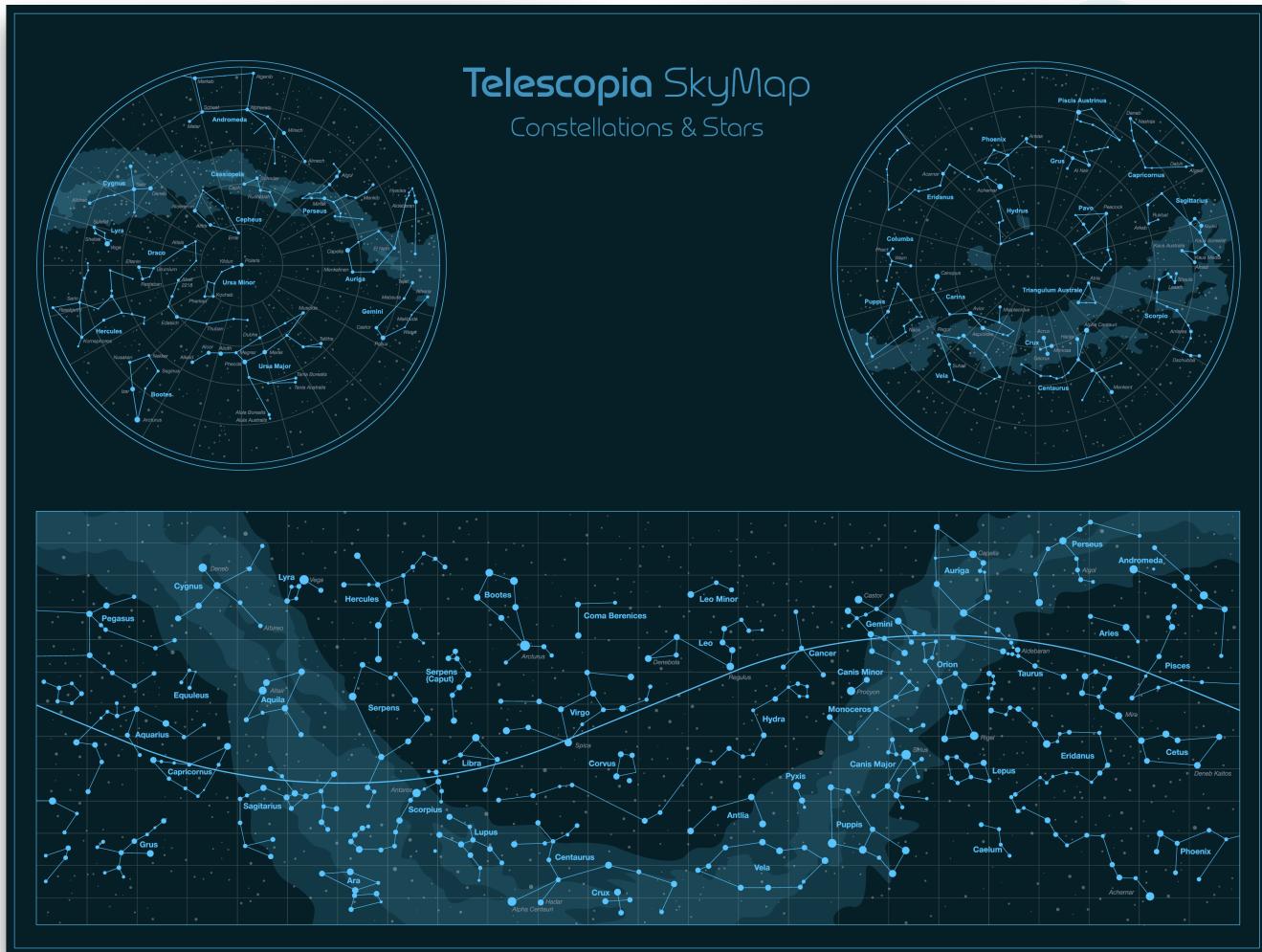
The GeoMap is implicitly used across Telescopia's algorithms to locate a telescope in the correct location and perfect weather conditions, while also locating a backup telescope for disconnected or temporarily unavailable ones.

- a. Session Elections.
- b. Telescope Booking.
- c. Observation Session Ordering.
- d. SkyTour.
- e. Astrophotography.
- f. Provider's Preparations.



# SkyMap I Celestial 360° Map

A SkyMap is a virtual representation of all celestial objects discovered within our observable universe which has an estimated radius of 46.5 billion light-years, including but not limited to: galaxy clusters, galaxies, constellations, nebulas, star clusters, stars, planets, moons, asteroids, comets and man made objects, the SkyMap database forces an underlying actively updated model complete with new celestial objects as scientist discover new ones.



The SkyMap has to have an observation point define by three physical variables: longitude, latitude and altitude, the point is critical to calculate the above and below horizon objects as well as the location of any celestial object. The observation point varies within Telescopia SkyMap based on the module and purpose of usage; It can be the location of a user or the location of an available telescope.

The extent of the SkyMap is flexible, due to several usage of the SkyMap throughout Telescopia; A boundary representation is the common theme for the SkyMap as the bounds will limit the number of objects in the map and thus be more responsive and representative to the module it is used for; The bounds are automatically computed depending on the module and purpose of usage.

## Objects Database

SkyMap database follows an openly editable content model which allows Telescopia community members to add, modify, or remove celestial objects, however Telescopia will also be constantly performing updates to the objects database.

The objects database is seeded from Telescopia knowledge center's object database.

## SkyMap Usage

Telescopia revolutionize the SkyMap so users can:

- a. Navigate the vast universe.
- b. Learn by selecting an object to explore more informations like: rise time, transit time, set time, distance from earth and sun, mass, volume and history.
- c. Book a telescope.
- d. Book or plan a SkyTour.
- e. Request astrophotography service.
- f. Preview the extent of a telescope a user is interested in acquiring.
- g. Confirm the capabilities of a telescopes or equipment the user is interested in buying from Telescopia marketplace.

## Mixed Reality SkyMap

One of the biggest features that Telescopia will offer is mixed reality SkyMap.

The MR capability of the SkyMap will transform how we traverse our vast universe virtually and make the entire experience much more immersive.

# Telescope Booking

Telescope booking is another convenient method of ordering one of Telescopia sessions, rather than waiting for the election algorithms or queue time, user can reserve a session and get into the session right at the reservation time.

The booking mechanism allows a direct access to provider's equipments, through the usage of the GeoMap locate method, thus offers more customization to the user.

The booking is available for object, private and group sessions.

## Object Observation

When placing the booking request the user is presented by a SkyMap to search and select the desired celestial object, then booking time, date, and session duration.

A GeoMap screen will show up after confirming the session duration that contain: available telescopes at the selected booking date and time pinned onto the map with weather forecast for each telescope location.

## Private and Group Sessions

When placing the booking request for a private or a group session the user will be presented by a GeoMap with weather forecast to select one of the available telescopes, the user can search by time, or location.

The accessory screen will show up after the telescope selection for the users, to select one or multiple accessories from the provider's inventory.

## Payment

After the user confirm the booking he has to complete the payment in CYRS.

## Provider

The provider have the option to accept or reject the booking, however the decision has to be taken within 6 hours of the initial booking request.

If the provider rejected the request, Telescopia will generate a list of suggested providers to the user based on the criteria of user's initial booking request, then the user is notified and has an option to accept and choose a new provider or receive a full refund.

After the provider confirm the booking, Telescopia will send the booking ticket/s to the user via E-Mail.

If the provider rejected multiple booking request without providing a reasonable explanation, Telescopia will issue a penalty to the provider.

The provider who is associated with a booking request will be notified prior to the start of the session to get their equipment ready, if the provider failed to connect in time for the booking session they will be issued a penalty and if they repeat this action they will be banned from Telescopia, if this case may happen the user will have an option to change the provider or receive a full refund.

After the session is concluded Telescopia will issue the provider's payment.

# Astrophotography

Astrophotography is a specialized type of photography for recording photos of astronomical objects, celestial events and large areas of the night sky.

Telescopia will grant the provider the option to offer astrophotography service, the provider should decide the price in CYRS for a small exposure image and multiply by exposure time for a longer exposure image.

## Capturing Process

When a user requests an image through this service a popup will appear with the needed details to successfully capture the image, then a price in CYRS is calculated based on the provider price and exposure time, the user is then obligated to complete the payment before the request is forwarded to the provider.

When a request is received by a provider he/she should start mounting the DSLR camera to the telescope and inform the user to start directing the telescope toward the target object for imaging.



Then user has to direct the telescope using Telescopia toward the desired object, before the provider start capturing the image.

After successful image capture the provider submits the RAW formatted image to Telescopia for the user to review.

The user has only 3 attempts by default (can be adjusted in the provider's settings) to capture the same image if there is no error from the provider's end.

After the user approval of the image, Telescopia will provide a link to download the RAW formatted image.

After the successful capture and acceptance by the user, Telescopia will issue the payment in CYRS to the provider.

# Super Resolution Astrophotography

Super-resolution technique reconstructs a higher-resolution image or sequence from stack of captured lower-resolution images.

The lower-resolution images can be captured from multiple telescopes pointing to the same area of the night sky.

Telescopia offers to its users: multi-frame or single-frame SuperResolution image through a stand-alone module, it works under a schedule so the user will be required to make a reservation.

In the reservation request the user will be required to enter the object/s to capture, resulting resolution and image type, then Telescopia will compute the quotation in CYRS and present it to the user.

Telescopia will automatically search and reserve multiple telescopes to capture the lower-resolution images and construct the super-resolution image using a decentralized network of computers, the resulting image is then submitted for review by Telescopia staff, then sent to the user for final review.

After the user approval of the image, Telescopia will provide a link to download the RAW formatted image.

# Providers

The providers are one the core foundations of Telescopia. Their operation and commitment are a cornerstone to the success of the entire project, therefore we offers a passive income for all telescope owners that are capable of operating and own the knowledge to actively participate throughout Telescopia.

The service provider is paid for sessions, for exposure time in astrophotography session and for consulting in sessions.

## Operational Requirements

To be a provider one is required to signup as provider through Telescopia DAPP and complete setting up the profile.

### Hardware

The service provider must meet number of requirements to participate in Telescopia.

1. 11 inch computerized telescope.
2. 24 MP CCD or CMOS color telescope attached camera with open SDK.
3. Optional auto-focuser.
4. Mount stabilisation pads.
5. Consistent telescope power source.

6. Laptop or PC connected to the telescope, camera and other equipments.
7. Optional 24 MP DSLR camera to be able to participate in astrophotography sessions.
8. DSLR light pollution reduction filter to be able to participate in deep space sessions.
9. Average Internet connection of 5 Mbps for easy streaming to Telescopia servers.

## Software

A small native service application (telescope local services) that will be available on both Windows and MacOS is required to be installed on a computer nearby the telescope as a middleware between the telescope and Telescopia API, the service will verify the necessary equipments are present and functional correctly, then the setup is completed.

Telescopia underlying telescope local services is designed to operate a computerized telescope however it doesn't require one with automatic focuser, but the provider will have to control the focus while the session is active thus staying near the telescope physical site. One can attach a manual telescope with camera attached to Telescopia but the provider will be required operate the telescope however they will have a lower priority within the provider elections.

## Holdings

The provider has to hold a certain amount of CYRS for every telescope they incorporate in Telescopia. The quota has to be registered in the smart contract, which is attributed to the rate of  $1\text{ }Telescope = 10000\text{ CYRS}$ . The quota is designed in order to ensure the payback period of  $6\text{ Months}$  which is practically the telescope year in one physical location as the rest of the year the weather forecast and sky clarity will be in doubt. Thus attracting those providers who are ready for a long-term cooperation.

To purchase a quota, the provider invokes the `tokenQuota(amount)` function of the smart contract and enters the desired amount of tokens as an argument. The indicated amount of tokens is locked and may not be used by the token holder for selling, leasing or any other purpose described in this document.

The token holder is eligible to modify the amount of locked tokens at any moment by invoking the `tokenQuota(amount)` function with the new number of tokens. The provider can empty the holding account and set it to 0.

When the user places a request for new session by invoking the `enterQueue(sessionType)` function of the smart contract, providers are selected depending on the holding amount in the smart contract, which should be more than  $10000\text{ CYRS}$  adjusted with the capacity factor over the years. The capacity is described in the financial section of this document.

## Validation

When a provider registers, his equipments are checked to meet the minimum requirements. Then a check that the provider is online that runs several times a day. Equipments and connection speed are validated routinely.

Equipment validation is a delicate process and done by automatically point to and capture a still image of an object, then compare the raw image with another one taken previously with the approximate equipment configurations. The algorithm compares the resolution, contrast, field of view, color depth, ISO and white balance, between the two images. The equipments is set to be validated when the it score more than 90%.

Equipment validation is initially performed daily before listing the provider as online and routinely to detect dishonest providers. A dishonest provider may claim another one equipments in order to pass the validation test. In this case, the provider will not be able to observe the objects assigned in a session, thus costing the entire network.

A dishonest provider or one who does not meet the requirements is disconnected from the service.

Validation is by the P2P principle. Network participants, i.e., the providers, initiate a check by sending a request to the smart contract to start it. The smart contract designates to the initiator the provider to be checked. During interaction with the provider, the users can also take metrics that are used for validation and send them to the smart contract.

After validation completion, the provider's evaluation is calculated and is listed in the election algorithms.

## Provider Service Reliability Assurance

A provider may be disconnected temporarily from the service or blacklisted for violating Telescopia operation rules or in a number of other cases. A blacklisted provider cannot be registered in the service.

If a provider is blocked for an intentional attempt to deceive the validation algorithm, he/she is fined for the amount of his holding tokens.

The validation algorithm operates effectively when the providers report accurate information about themselves. If a provider provides false information, this will be exposed during the validation and the provider will be disconnected from the service and the his/her Ethereum e-wallet will be blacklisted.

If the provider ceases to meet the minimum requirements, he/she is disconnected from the service and may re-register only an hour later. If during the next validation time of registration the equipment and speed requirement is not met, then the time for the next possible registration will be doubled.

The provider is required to inform the smart contract one hour before disconnecting from the service, to allow the election algorithms to reroute the next longer duration sessions to another provider and assign to him/her a smaller duration session. If the provider is disconnected repeatedly from the service without prior notice to the smart contract, then he/she is banned and may re-register only within a month.

## Day to Day Operations

We care deeply for Telescopia day to day ease of use approach for the providers as the only manual job required is the initial telescope alignment.

After the alignment of the telescope the provider has to connect it to a computer with internet connection to Telescopia through the telescope local services.

During a group session the provider is required to change the telescope accessories as requested.

The telescope local services will keep track of the telescope and notify the provider through the DAPP if it encounter a connection or visual problems.

The provider will be able to monitor, control and manage their telescope/s, get notified of any problem that may occur during the telescope time connected to Telescopia as well as monitor the progress and manage their earnings from a mobile administration DAPP that will be available for both IOS and Android.

The DAPP will also allow the provider to perform some the operative tasks like tour guiding and consultation, the app will also feature marketplace section.

## Add-on Services

Telescopia only fixate the prices of the sessions. Add-on services are priced by the providers and they enter an internal tender system for every add-on service provided.

The internal tender system relies on the providers to set their asking price for the add-on services they provide depending on their equipment quality and their knowledge. The list below shows some of the add-on services the provider may opt-in:

- a. Session Consultation
- b. Market Place Consultation
- c. Tour Guiding
- d. Long Exposure Astrophotography

Telescopia will recommend prices under its guidelines, however the pricing system is dynamic and is solely the decision of the provider.

The provider however cannot change the session prices as it is fixed and is decided solely by Telescopia, because it would be hard to stabilized the session prices, as we target large segment of consumers.

## Provider Roles and Profile

The provider can have multiple roles throughout Telescopia.

- a. A passive provider whom job is only to setup the telescope and leave it connected to Telescopia.
- b. An operative provider that has to actively invest moderate amount of the night time performing multitude of the add-on services to the users.

The passive provider earns much less CYRS than the operative counterpart and is lower in priority in the session elections to be elected to new sessions.

## Provider's Profile Details

The provider profile contains:

- a. Basic, location and contact informations.
- b. Area of expertise i.e. planets, nebulas, stars, man made objects etc.
- c. Total session time.
- d. Associated telescope.
- e. Available accessories.
- f. Availability schedule.
- g. Marketplace items.
- h. Consultation profile.
- i. Rating and reviews.
- j. Available services i.e. observation, still imaging, consultation and tour guiding.
- k. Profile composer.
- l. Donations.

## Provider Accounting

A full analytic accounting dashboard is present in the provider's control panel to keep track of orders, reservations and payments.

The providers can opt-in their telescopes to be premium listing for amount of CYRS.

Telescopia will manage all of its providers accounts and ledgers using Odoo; All providers will have access to their accounting, sales and performance information and analysis.

## Provider Ranking System

Telescopia will implement a ranking system for the providers will be present in their profiles that evaluates their performance and equipments, providers will be able to increase their rank based on several conditions:

- a. Users overall rating for the provider's service.
- b. Reasonable Pricing.
- c. Getting involved in multiple activities like tour guiding, market consultation, etc.
- d. Overall astronomy and equipments knowledge.

The provider rank directly effect his/her chances to be elected to a session, so maintaining good rank is essential for the provider to elevate his/her CYRUS earnings.

## Expert Consultations

Telescopia incorporates a vast professional astronomers network that is mostly constituted of scientific members; They play an important role in advising our users and lecture them about our expansive universe.

While enjoying one of Telescopia sessions, users can request a professional consultant to accompany them in their Telescopia adventure lecturing them on what they see and encounter.

The service is available within:

- a. Private Sessions.
- b. Group Sessions.
- c. SkyTour.

This is a time based service, for which a consultant specify the cost/hour in their profile, a list of available and online consultant is shown to the users when they book any of the above services.

This service is available only through booking and not for instant sessions orders.

The consultant will be sent a request for any incoming booking via e-mail which can be accepted or rejected; Accepted requests will be shown in the consultant's calendar that can be accessed within their profile.

A weekly and daily schedule will be sent via an e-mail to the consultant and 1 hour notification before the session starts.

Within the session the consultant will see what the users sees and can communicate using VOIP, chat, share documents, or use an interactive web based whiteboard.

A free of charge session record capability will be available exclusively for the consultant and can save the records in Telescopia cloud storage with up to 10G of free space with the option to increase it for additional cost.

Users will be granted the option to buy the session recordings from the consultant.

## Lecture Rooms

Telescopia includes a web based lecture room that offers:

- a. Pre-lecture preparations with office imports.
- b. Interactive web based whiteboard.
- c. Wikipedia references with live mockup.
- d. Telescopia encyclopedia references with live mockup.
- e. Upload reference papers with live mockup.
- f. Live telescope window with live mockup.
- g. SkyMap with live mockup.
- h. VOIP service with optional video conference capability.
- i. Live lecture recordings.



A consultant can use Telescopia lecture room in private, group sessions, or record a lecture and offer it for sale in Telescopia marketplace.

Telescopia lecture rooms will be later available in full immersive virtual reality experience for which a full lecture room will be constructed in VR complete with lecturer and attendees avatars will be present.

Telescopia consultants can also contribute to SkyMap and encyclopedia data and can propose a SkyTour path.

# Knowledge Center

Telescopia offers a comprehensive library of celestial objects, telescopes and accessories.

The knowledge center is integrated deep across Telescopia, to which all members can acquire informations while using Telescopia for they can search the encyclopedia for celestial objects, telescope informations and accessory best usage.

Telescopia knowledge center's database follows an openly editable content model for community members to add, edit or remove its contents, however Telescopia staff will passionately provision the database to maintain accurate infos and listings.

All astronomical objects will be seeded from Telescopia object database catalogs.

Below is a draft of what the encyclopedia will entail for each subject.

## Sky Object Profile

- a. Detailed informations with illustrations and videos.
- b. Origin, History, future and discovery.
- c. Best telescopes and location at this time to observe.
- d. Consultants links and additional knowledge links.
- e. Compatible accessories and marketplace link.
- f. Rating and reviews.
- g. Price suggestion and link to the marketplace.

## Telescope Profile

- a. Detailed informations with photos and videos.
- b. Best usage for: a limited SkyMap that illustrates the telescope power.
- c. Available providers and availability schedule with booking module if applicable.

## Accessory Profile

- a. Basic informations with photos and videos.
- b. Best usage section.
- c. Rating and reviews.
- d. Price suggestion and link to the marketplace.

# Telescopia Market Place

Telescopia incorporates a versatile marketplace for telescopes, equipments and accessories; users and providers have the capability to sell items, trade, or auction their used or new items, using Telescopia's CYRS.

## **Listing and Deals**

When listing an item, Telescopia will suggest a description and title to the item to help the lister, those details will be compiled from Telescopia knowledge center and other marketplaces databases.

Telescopia marketplace will occasionally offer a bundled deals that consists of a telescope and some accessories.

The marketplace will entail third party listers e.g. a telescope trading company.

Marketplace items will have a price history complete with other marketplaces prices section for buyers and listers to compare with.

Users have the option to opt-in for a premium listing for additional amount of CYRS.

Telescopia marketplace will entail third party listers e.g. a telescope trading company.

## **Trade**

A lister can trade their telescopes and/or accessories, through Telescopia marketplace, the lister can be offered one or multiple items in exchange for their listing; The trade will be free of charge from Telescopia, however Telescopia will ensure the trade legitimacy and completion through multi-layer confirmation system.

## **Sales Listings**

Telescopia marketplace will allow the users and providers to make a sales listing for their telescopes and accessories used or new.

## **Auction**

A user or a provider can start an auction for any of their telescopes or accessories.

## Telescope Builder

Telescopia marketplace will provide a tool to help achieve the best build for the observation target and budget, the tool will present the buyer with several question to determine the objective and running environment, then it will generate a setup complete with accessories within the target budget, along with a SkyMap showing the projected results based on the time of observation and the equipment generated. This tool can also be used to get recommendation for specific accessory of a telescope build based on what the buyer wants to observe, it will take into account the accessories in the buyer's possession. If an item is not found in the marketplace, Telescopia will search for the item in Amazon and eBay.

Build of the week section will be available within the marketplace module, with the option to buy all or some items of the build, along with community rating and reviews.

## Buyer Consultation

Buyers can ask for a dedicated community consultant to assist with their purchase, the they can be any member of Telescopia that opted-in to be a marketplace consultant, their work will be for a time based payment system.

## Used Equipments

All used marketplace items must be verified as functional prior to listing using Telescopia verification methods, it will entail connecting the telescope or accessory to Telescopia and test its functionality using the respective automatic tests that is administered by Telescopia; Using this verification Telescopia will make sure that the lister is in position of the item and the item is working correctly.

If something is wrong with the item, the lister can use Telescopia troubleshoot functionality to help with identifying the issue, then the lister can reverify the item and list it.

## Pricing Plan

Being a new product on a very competitive market put a huge challenge when deciding the price of the product, we have studied a lot of products and how pricing effected their success and future growth, we came up with a modest pricing plan for our Telescopia products line.

## Consumer Segmentation

Telescopia target consumers are segmented into multiple groups based on the product value and usage:

## Educational

This group encapsulates student and teacher consumers and will most likely use SkyTour, Private or Group sessions.

## Professional

This group encapsulates researchers, amateur astronomers and professional astronomers and will most likely use Private or Group sessions.

## Explorational

This group encapsulates the explorers and general public and will most likely use SkyTour, or Object sessions.

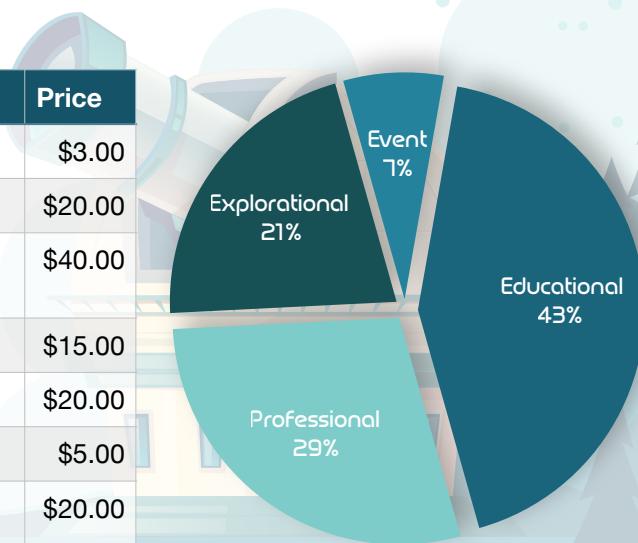
## Event Driven

This group encapsulates event driven consumers and astrophotographers and will most likely use Object sessions.

## Pricing Policy

Based on the above segmentation we have placed our starting prices for our products to reflect the return value for each group.

Session Type	Usage Group	Price
Object Observation	Event Driven and Explorational	\$3.00
Private	Professional and Educational	\$20.00
Mixed Reality Private	Professional and Educational	\$40.00
Group	Professional and Educational	\$15.00
Mixed Reality Group	Professional and Educational	\$20.00
SkyTour	Educational and Explorational	\$5.00
Mixed Reality SkyTour	Educational and Explorational	\$20.00



## Pricing Verification and Survey

To roughly verify and stabilize the prices, we made a survey of a control group that consisted of 1000 consumers in the Middle East to reflect on how the prices are suitable for the value and made adjustments accordingly.

## Discounts

For the first 2 years Telescopia will offer a discount of 20% on all of its services to help build our consumer base.

# Commission Policy

## Telescopia Commission

Telescopia commission rating is fixed across all of its sessions to 20% after deducting the marketing costs and bandwidth costs which can be represented using the following arithmetic equation.

$$t = r \sum_{i=1}^n R_i - (m_i + b_i)$$

Where  $t$  is the total commission value from  $i = 1$  to  $i = n$ ,  $n$  is the session id,  $r$  is the commission rating percentage,  $R$  is the total session revenues,  $m$  is the session marketing costs and  $b$  is the total session bandwidth cost.

## Provider Session Payable

The provider session payable is the sum of Cyrus telescopia pays the provider for his service in a set of attended sessions, which is calculated by subtracting telescopia commission, marketing cost and bandwidth cost from the session revenues, the provider payable can be represented using the following arithmetic equation.

$$p = \sum_{i=1}^n R_i - (t_i + m_i + b_i)$$

Where  $p$  is the total provider payable value from the set of attended sessions represented by  $i = 1$  to  $i = n$ ,  $R$  is the total session revenues,  $t$  is the session telescopia commission,  $m$  is the session marketing costs and  $b$  is the total session bandwidth cost.

## Market Place Commission

For the marketplace Telescopia commission will be fixed to 1% of the transaction value.

$$m = r \sum_{i=1}^n s_i$$

Where  $m$  is the total commission value from the set of marketplace transactions represented by  $i = 1$  to  $i = n$ ,  $r$  is the commission rating percentage,  $s$  is the marketplace transaction value.

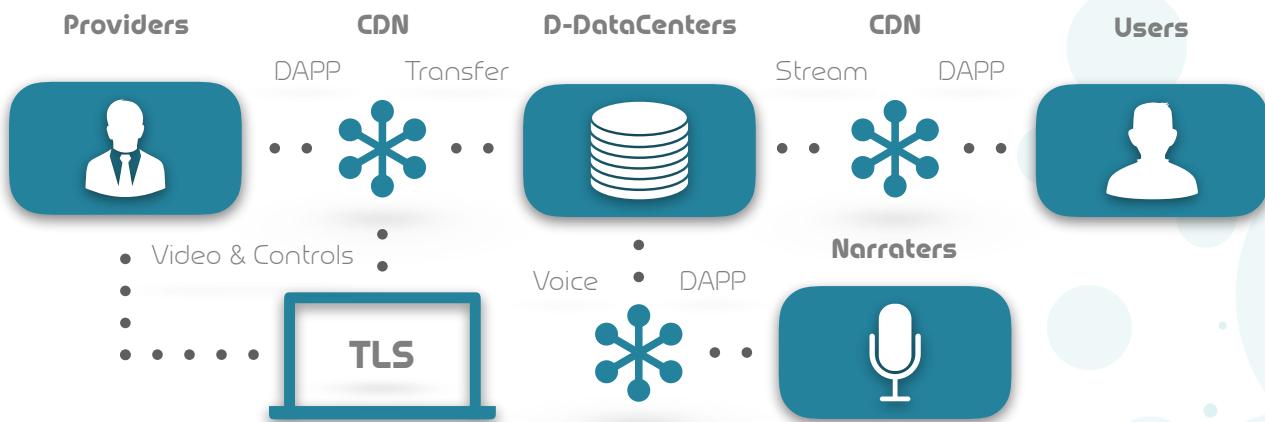
Session Type	User Cap
Object	10
Private	1
MR Private	1
Group	10
MR Group	10
SkyTour	30
MR SkyTour	30

# System Design

Telescopia is designed with peer to peer foundation, using a semi-decentralized architecture that allows us to construct a secure, modular and fast performing system.

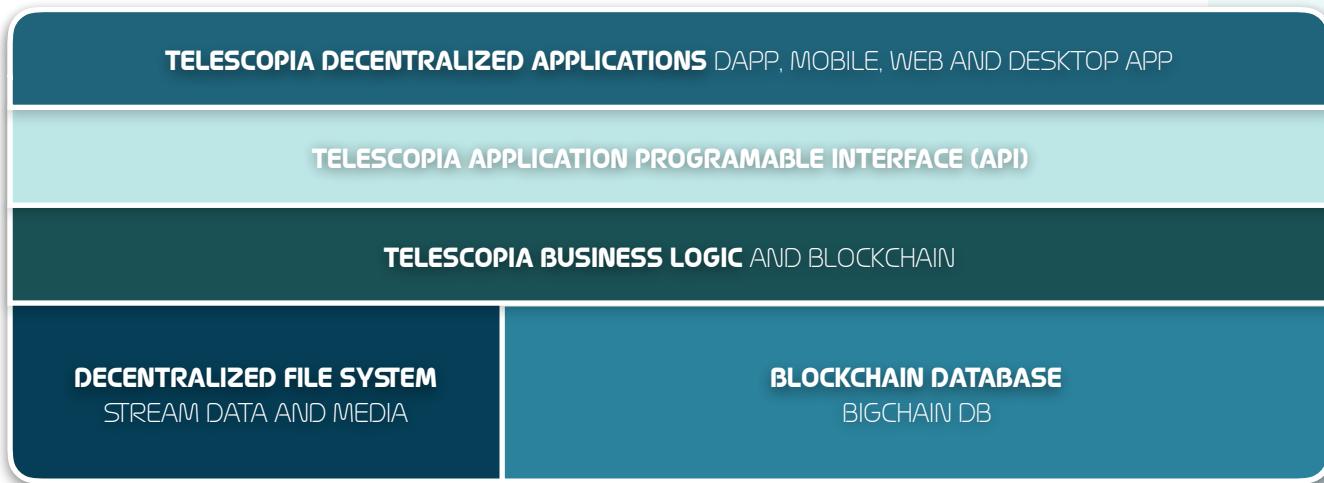
The overall system consists of 5 main pillars:

1. Telescope local services (TLS) to stream the video and telescope control tokens to the nearest CDN node.
2. The providers are connected to each other in a decentralized network through the DAPP, as they can perform varieties of tasks and transfer the data to the datacenter through the nearest CDN node.
3. The narrators are also connected to the network through the DAPP as they add the voice part of the stream.
4. The decentralized datacenter network are responsible to execute the heavy processing load of the system, while this is a centralized node, it does execute the algorithms and data manipulations in a private decentralized network between all connected servers.
5. The users are connected to the network through the DAPP as they downstream from the CDN to enjoy Telescopia experience.



## System Architecture

The communication architecture constitutes how the system components interact with each other. Having the data storage and database controlled solely by Telescopia business logic algorithms that executes in the datacenter servers. API to handle the incoming and outgoing transactions between the business logic and DAPP, mobile applications, website, or desktop app.



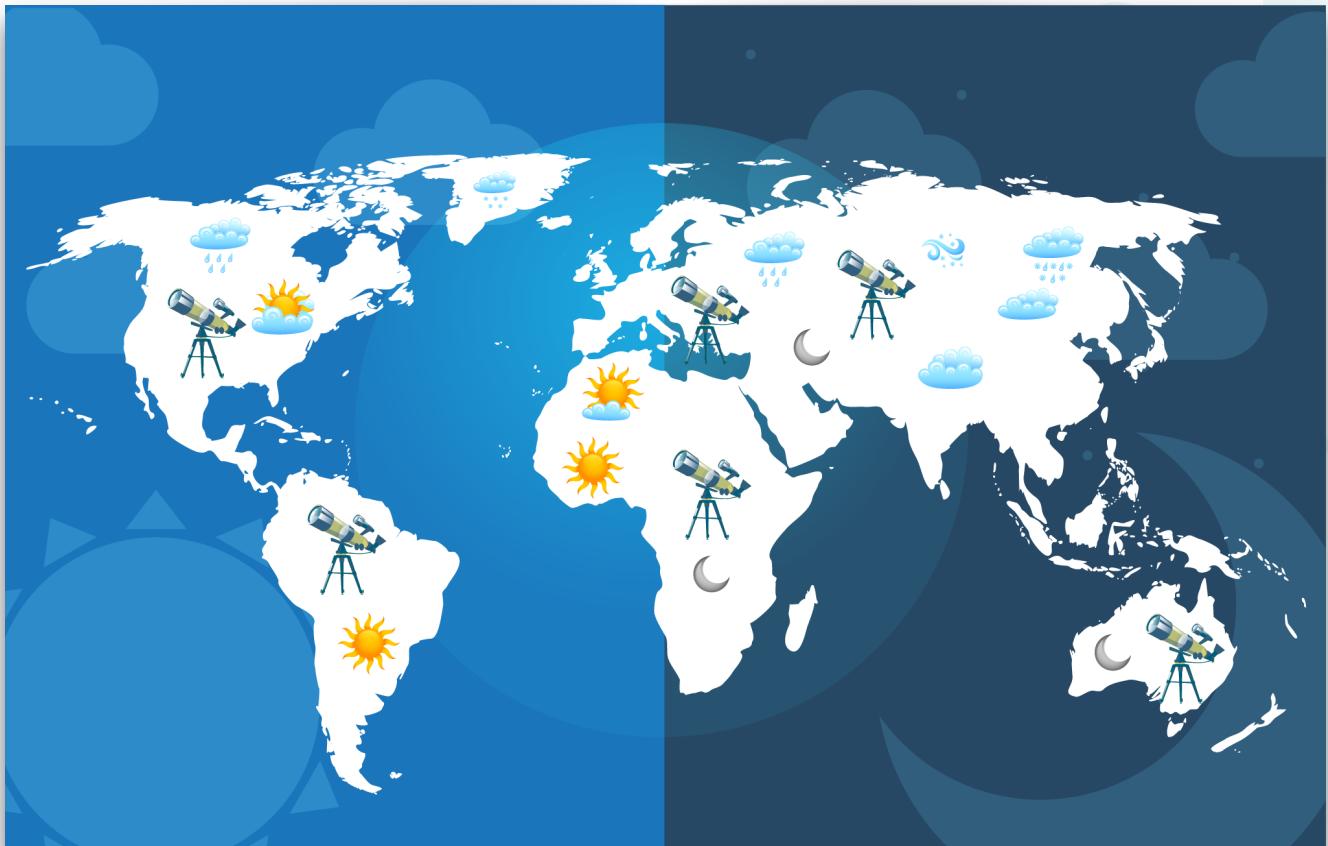
## Operational Requirements

### Daily Requirements

To achieve 24 hours daily operation given that one telescope is limited to only 12 hours at most every day to observe all of the space objects with the sun exception, to solve this issue telescopia are required to provide at minimum 2 telescopes positioned 12 hours from each other.

## Seasonal Requirements

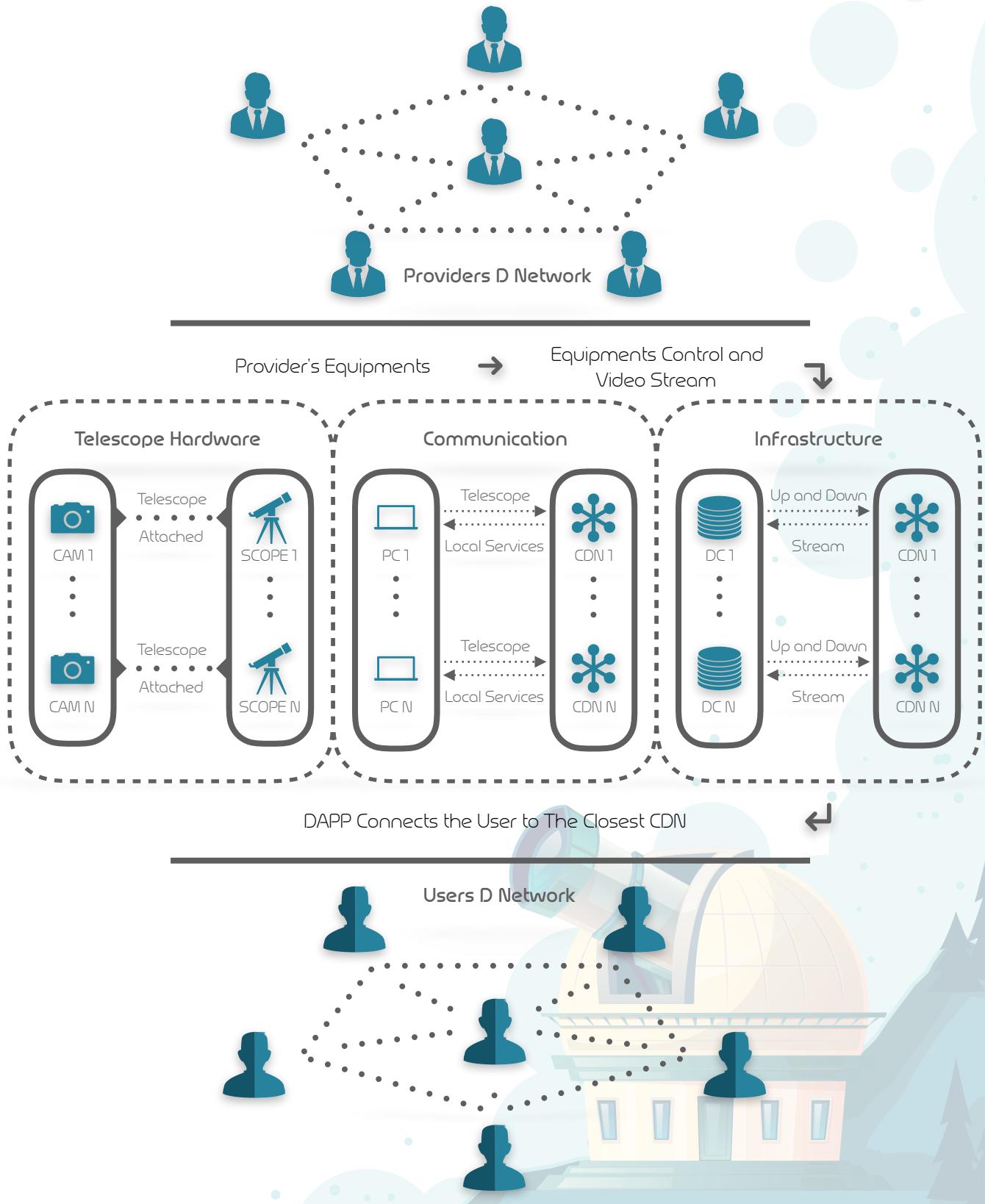
To achieve 365 day operation given the weather condition, humidity and sky clarity and given that one set of telescopes is limited to 6 months of operation every year due to seasons, telescopia are required to provide at minimum 3 triangulated telescopes at each side of the equator to account for the sky clarity and weather conditions and daily operation.



In conclusion telescopia are required to provide 3 telescopes positioned as a triangle on the globe for each session to be completed successfully and an additional 3 backup telescopes positioned in the opposite side of the equator to accommodate for the seasons change.

Telescopia plans to operate its telescopes in different countries via contractors and partner companies in the first three years then via subsidiaries from 2022 onward.

## Operation Overview



# Telescope Control

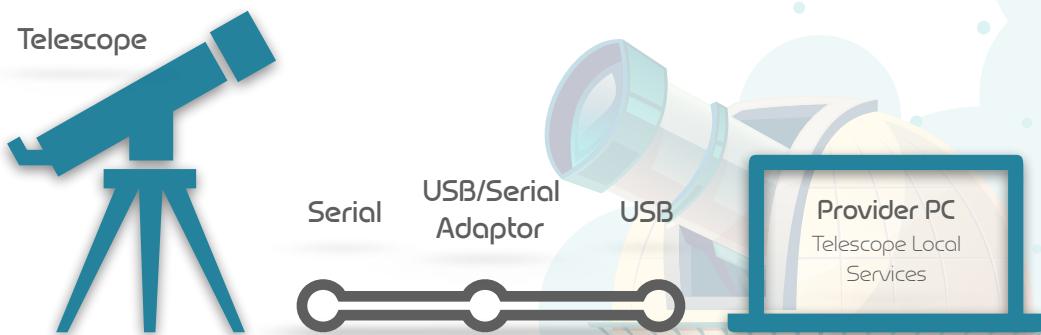
# Telescope Mount Control Protocols

Telescopia will support the most common telescope mount protocols in the first two years, below is a table of the supported mount protocols and telescopia support year.

Mount Protocol	Support Year
LX200	2019
Temma II	2020
NexStar	2019
Sky Commander, Losmandy DSC and ServoCAT	2019
Astro-Physics	2019
Ultima 2000	2020
Gemini	2019
iOptron	2020

## Telescope Connection

The connection to all telescopes is done with a USB/Serial adaptor. The Keyspan HS and FTDI adaptors have proven to be very reliable. The provider also need a cable that runs from the DB9 connector on the adaptor to the serial RS-232 port on their scope. Most telescope companies sell a cable that is designed to work with their scopes.



Once the providers have their computer connected to the USB/Serial adaptor and the adaptor connected to their scope, they are ready to connect Telescopia and their telescope. For most telescopes it is best to follow the scopes startup and alignment procedure before the provider connects to Telescopia for the first time.

## Error Handling and Correction

If the connection fails for some reason an alert message will be issued with guided instructions to help diagnose the problem. Otherwise the Scope View window with the control panel will open if it is not already open and the connection to telescopia servers is started and ready.

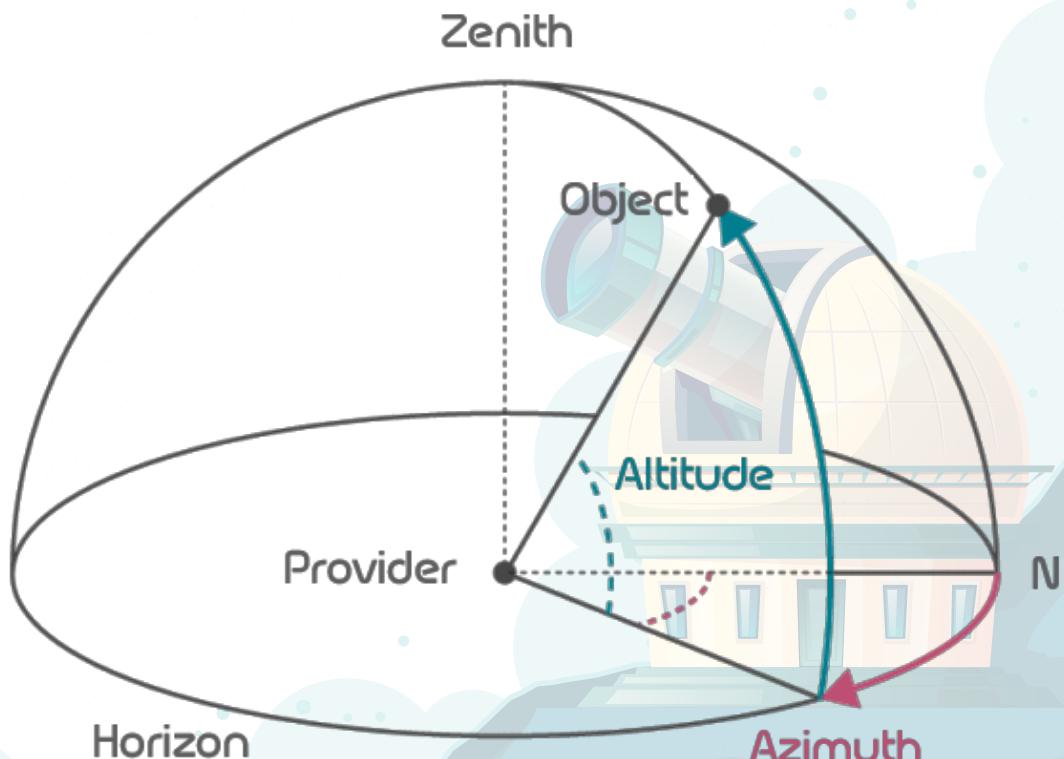
## Communication

All the movements, tracking and guiding transactions will be processed by the telescope local services on the provider's computer then passed to the telescope through the usage of the telescope guiding system and telescope mount control protocol.

# Telescopia Guiding System

Telescope guiding is the engine of Telescopia, as this algorithms keeps the telescope pointed precisely at an target being observed in one of the sessions by sending a horizontal coordinates to the telescope mount. This prevents the object from drifting across the field of view during the session time.

The horizontal coordinate system, also known as the Alt/Az system, is a method for describing the exact position of objects in the sky; Based on two coordinates, altitude and azimuth, the horizontal coordinate system provides the general direction in which to find a celestial object and point the telescope. Although the distance of the visible planets, stars and galaxies differs by billions of light years, the system ignores the depth of space as an object's distance is irrelevant for the purpose of locating it in the sky.



Telescopia uses one of two guiding techniques:

- a. In mount guider

Using mount protocol we can guide the telescope by sending the object id so the mount can do the tracking job for us or the object coordinates (Alt/Az).

#### b. Trajectory processing guider

If we have to send target coordinates to the mount, it is our job to run the tracking algorithms and keep feeding the new coordinates to the telescope via the mount protocol, while continually calculating the target position and velocity from the telescope coordinates (LAT/LONG/ALT), date and time.

For optimization purposes the object coordinates will be calculated prior to the start of the session, while in session the telescope local service will continually check for changes in target coordinates within the pre-session data, thus keeping the object in the field of view and achieving better performance.

## Quality of Service

Telescopia API will verify the observed objects based on 2 scores:

### Telescope Coordinates

When the provider's telescope completes its navigation to the target object, telescopia API will report back the coordinates for every movements to be verified with the computed path on the platform this process will be repeatable for every object the telescope navigates to.

### Tracking

Telescope tracking has to be accurate for a successful observation session so we need to keep track of the speed and direction of the tracking algorithm which should be computed prior to the start of the session and verified during the session. The tracking will also auto correct the speed and/or direction if required.



## Imaging and Video Capture

Telescopia core foundation is the video and image capturing capability that is a fully automated process.

Still or video capturing methods and algorithms are located in Telescopia API and executed on the provider's computer via the telescope local services.

# Supported Devices

We recommend using a camera with open software development kit like QHY367C from QHYCCD, as it is easier to automatically operate; We will start integrating such cameras into Telescopia from the start, the list of supported capturing devices will be available for the providers.

As for professional Digital-SLR cameras Telescopia will support:

1. Sony E-Mount DSLRs

All supported Sony devices can be found [here](#).

2. Most of Nikon DSLRs

All supported Nikon devices can be found [here](#).

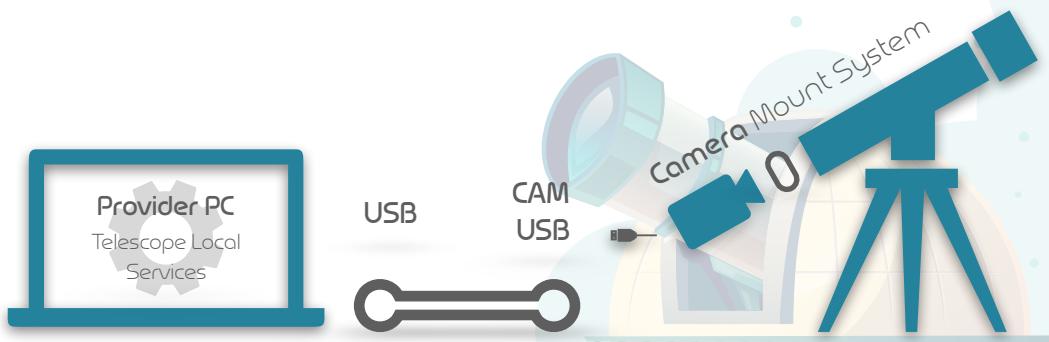
3. Most of Canon DSLRs

All supported Canon devices can be found [here](#).

## Camera Connection

The cameras are attached directly to the telescope via a special connection manufactured specifically to work with a camera mount system.

The camera is then connected to the computer via a USB connection provided with the camera.



Having the camera connected, the telescope local services can control and capture the video or the still image using the camera specific software development kit that is integrated in Telescopia.

Using the SDK Telescopia can control the exposure, focus, shutter speed and much more.

## Communication

All image and video transactions are processed on the provider's computer then forward via Telescopia API to the closest CDN server for much needed performance gain.

## Image and Video Post Processing

To achieve better images and videos, Telescopia is obligated to process the videos and images before presenting it to the end user, however the post processing algorithms has to be very fast and effective.

Telescopia will automatically perform post capturing image processing on all of the view and still images using the following algorithms:

1. Signal to Noise Ratio Analysis.
2. Luminance Master Processing.
3. High Pass Filtering.
4. Color Saturation.
5. Deconvolution.

## Object Database Catalogs

Telescopia will initially support more than 1 billion space objects compiled from 57 universally used astronomical catalogs.

The object database will be constantly updated as scientist discover more objects.

The list below briefly present the catalogs with the most objects count and its primary objects type.

Catalogue	Full Name	Primary Type	Objects Count
<b>USNO</b>	USNO B1.0	Stars, Galaxies	1,042,618,261
<b>Tycho</b>	Tycho-2 Catalogue	Stars	2,500,000
<b>PGC</b>	Principal Galaxies Catalogue	Galaxies	983,261
<b>AG</b>	Astronomische Gesellschaft Katalog	Stars	183,145
<b>WDSC</b>	Washington Double Star Catalog	Double Stars	141,743
<b>HIPP</b>	Hipparcos Catalogue	Stars	118,000
<b>LEDA</b>	Lyon-Meudon Extragalactic Database: See PGC	Galaxies	73,197
<b>CGCG</b>	Catalogue of Galaxies and Clusters of Galaxies	Galaxies, Galaxy Clusters	29,418
<b>ESO</b>	ESO / Uppsala Survey of the ESO (B) Atlas	Galaxies, Planetary Nebulae, Clusters	18,000
<b>ADS</b>	Aitken New General Catalogue of Double Stars	Double Stars	17,180
<b>UGC</b>	Uppsala General Catalogue of Galaxies	Galaxies	12,921
<b>NGC</b>	New General Catalogue	Various	7,480
<b>IC</b>	Index Catalogue	Various	5,386

<b>AGC</b>	Abell Catalog of Rich Clusters of Galaxies	Galaxy Clusters	4,073
<b>ES</b>	Rev TE Espin	Double Stars	2,736
<b>HAFFNER</b>	New Galactic Star Clusters in the Southern Milky Way	Various	1,957
<b>LDN</b>	Lynds' Catalogue of Dark Nebula	Dark Nebulae	1,802
<b>BU</b>	Shelburne Wesley Burnham's Double Star Catalogue	Double Stars	1,515
<b>PK</b>	Perek - Kohoutek	Planetary Nebula	1,510
			<b>1,046,721,585</b>

# Technical Workflows I

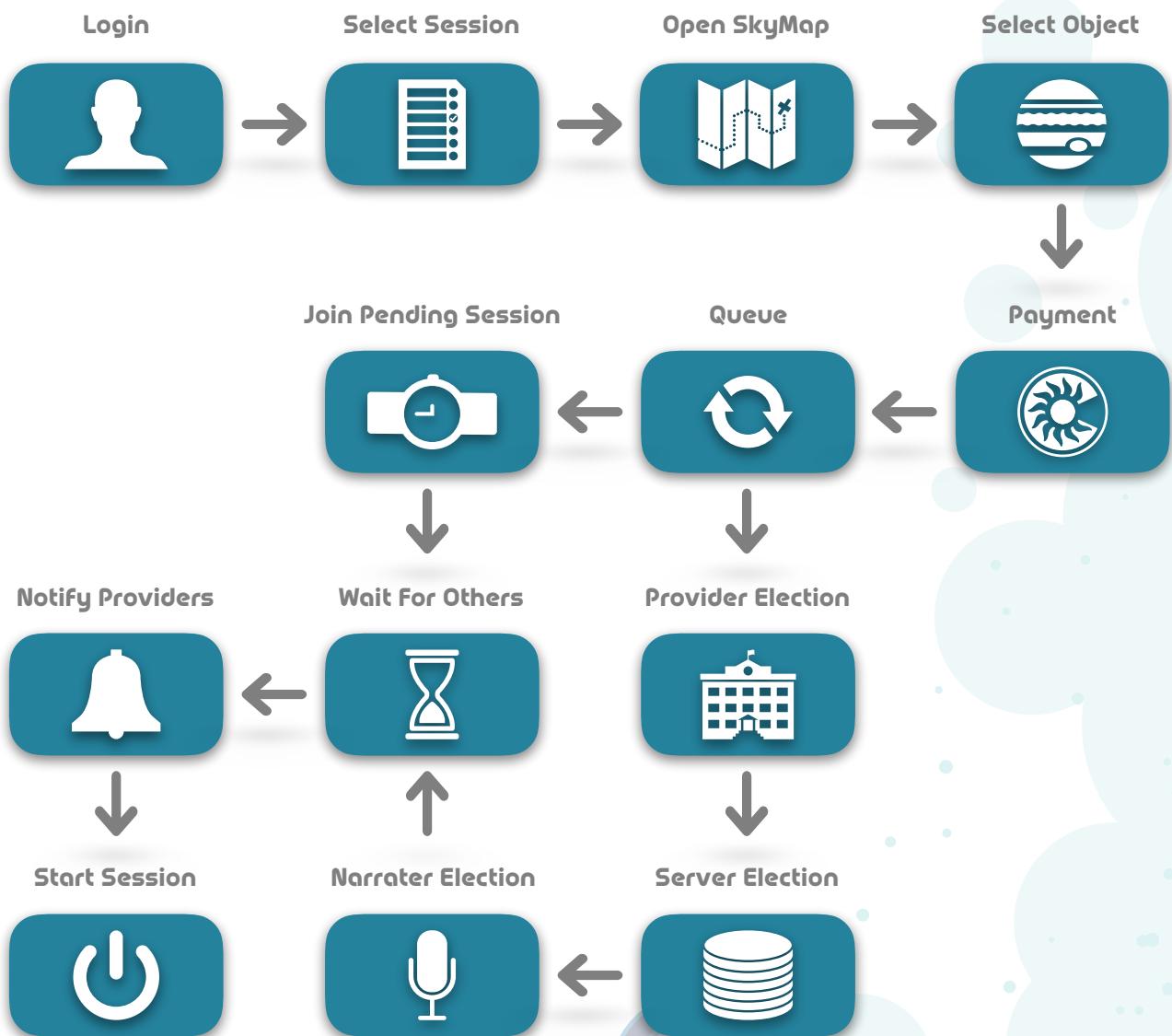
Pre Session

Due to the complexity of Telescopia as a software project, there are several measures to take into account to achieve high performance, overall system stability, user ease of use and ultimately user satisfaction and equalize the profit across all system providers while maintaining a fast and secure platform; Firstly we need to break down the pre session operational workflow from user login to session start; However it differs from session to session and from service to service.

The following graphs will draw a guide line for Telescopia sessions, for which we can explain in much details how we will implement such decentralized platform and complex integrated block chain.

## Object Observation Session

The object observation contains mostly automated algorithms that allocates the resources for the user and elect the best provider with the correct location, optical equipments and accessories, as well as electing the best base server with the lowest latency and the narrator with the appropriate language.



## 1. Login

The user will start by logging in.

## 2. Select Session

The user selects a session in this case an object observation session.

## 3. Open SkyMap

The SkyMap will show up for the user to search and/or select an object for the session.

## 4. Select Object

The user will have to select an object from the SkyMap to queue up for the session.

## 5. Payment

The payment screen will show up at this point to process the user payment for the session.

## 6. Queue

The user will be presented by short story video or text regarding the object he selected in step 4 while he or she waits for the session to start. At this point the system will take over and run its internal algorithm to search for another group in waiting stage to join (group making algorithm), or start up a new group which will fire the election algorithms.

#### 6.1. Join Pending Session

If a group found, the user will join them in the queue stage and move on to the waiting stage.

#### 6.2. Elections

If there are no group for the object the user has selected, a new group is formed with the current user and the system starts the election algorithm to select the best provider, server and narrator.

##### 6.2.1. Provider Election

The provider election algorithm is specialized in narrowing down the best providers with the best equipments qualified for the observation object, the resulting top 3 providers are then locked to this group and wait the start of the session.

##### 6.2.2. Server Election

The server election algorithm is specialized in narrowing down the best servers to stream the session from.

##### 6.2.3. Narrator Election

The narrator election algorithm is specialized in narrowing down the best narrators for this session.

#### 7. Wait for Others

This is a buffer stage for which the system will constantly check for group completion and queue time limit, while waiting a group chat and collaboration activities are started between all the attendees until the session user capacity is reached or the time limit for the queue reached.

#### 8. Notify Providers

At this stage the session is ready to start and waiting for the provider to start, the system selects one of the 3 elected providers and notify to start the session; while keeping a backup provider incase of emergency.

#### 9. Start Session

## Private Session

The private session is highly versatile as it allows the user to take control over the telescope and multiple other factor such as quality, session duration and accessories to use, while maintaining the automated algorithms used in the object observation session.



#### 1. Login > 2. Select Session

These steps are done in the same manner as the object observation session.

#### 3. Select Quality

The user has the option to set the telescope preferences and stream quality with up to 4k stream in private sessions.

#### 4. Select Duration

The user can change the session duration to suite his needs.

#### 5. Open SkyMap

The SkyMap will show up for the user to search and/or select the session objectives.

#### 6. Compile GeoMap

Telescopia Starts to compile a list of the available telescopes that can fulfill the user session objectives and present them on a GeoMap for the user to select one telescope from.

## 7. Select Location

The user selects a telescope from the GeoMap to be in use throughout this session.

## 8. Select Accessories

The user can request an accessory to be available or installed on the telescope for the purpose of this session.

## 9. Payment

The payment screen will show up at this point to process the user payment for the session.

## 10.Queue

The user will be presented by short story video or text regarding the session objectives he selected in step 5 while he or she waits for the session to start.

## 11.Elections

In private session the election process is semi-automated, due to the session versatility the user can select a telescope and omits the provider election all together; However the server and narrator elections are fully automated like in object session.

### 11.1. Provider Election

The provider election will be omitted if the user selected one telescope, while if the user didn't select a telescope or selected multiple telescopes the election algorithms will run and operates like an object session.

### 11.2. Server Election > 11.3. Narrator Election

These steps are done in the same manner as the object observation session.

## 12.Notify Providers > 13. Start Session

These steps are done in the same manner as the object observation session.

## Group Session

The group session is designed for group of observers that like a private session has full control of the telescope and session preferences with advanced controls over the telescope geographic location.



#Add an introduction to the section below

### 1. Login > 2. Select Session

These steps are done in the same manner as the private session.

### 3. Select Start Time

In group session the user has to set a start time for the session for which all invitees will be ready.

#### 4. Select Quality

The user has the option to set the telescope preferences and stream quality with up to 8k stream in private sessions.

#### 5. Select Duration > 6. Open SkyMap > 7. Compile GeoMap > 8. Select Location > 9. Select Accessories > 10. Payment

These steps are done in the same manner as the private session.

#### 11. Invitation Roll Out

The group admin (user) sends the session invitations out either manual or automatic by filling up the connection medium contacts.

#### 12. Wait Start Time

Telescopia will hold the session until the start time is reached then it will move on to the next step.

#### 13. Check Invitees

Telescopia will constantly check for the session attendees and notify the status to the group admin.

#### 14. Queue

The group will be presented by short story video or text regarding the session objectives, while Telescopia prepares the session.

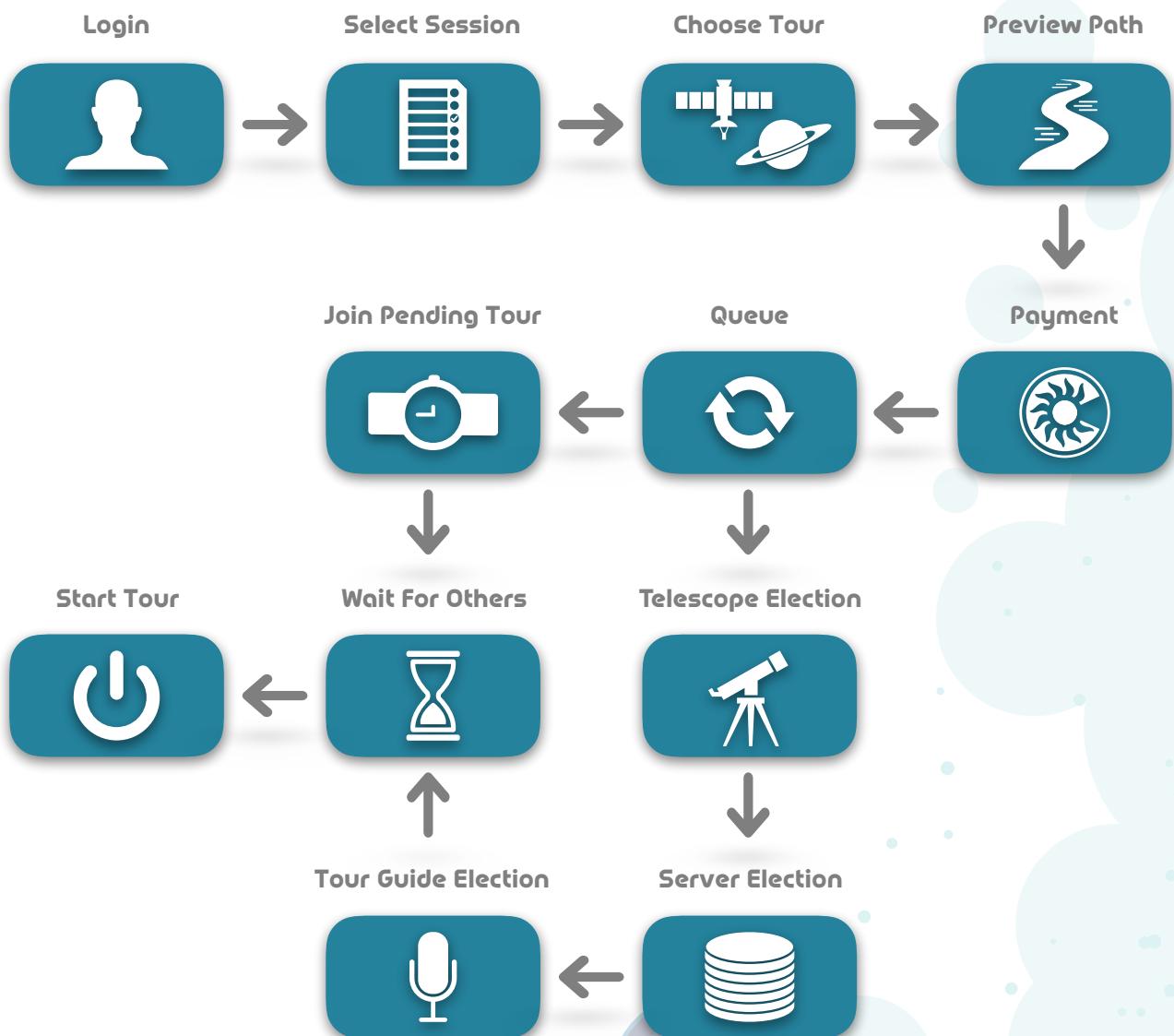
##### 14.1. Provider Election > 14.2. Server Election > 14.3. Narrator Election

These steps are done in the same manner as the private session.

#### 15. Notify Providers > 16. Start Session

These steps are done in the same manner as the private session.

## SkyTour



#### 1. Login > 2. Select Session

These steps are done in the same manner as in the group session.

#### 3. Choose Tour

In this stage the user is presented by list of available SkyTours to choose from and the tour type if its individual (default), private, or group.

#### 4. Preview Path

The user is then presented by a SkyMap showing the tour's path in details to review before moving on to the next step.

#### 5. Payment

These steps are done in the same manner as in the group session.

#### 6. Queue

The tour's attendees will be presented by short story video and text regarding the tour's path, while Telescopia prepares the necessary requirements for the tour.

## 7. Join Pending Tour

If a tour found, the user will join them in the queue stage and move on to the waiting stage.

## 8. Elections

If there are no group found, a new one is formed with the current user and the system starts the election algorithms to select the best telescope, server and narrator.

### 8.1. Telescope Election

While Telescopia exclusively provide the telescopes for SkyTour sessions, it is best to run a narrow down algorithm to elect the best telescope for the tour's path.

### 8.2. Server Election

The server election algorithm is specialized in narrowing down the best servers to stream the tour from.

### 8.3. Tour Guide Election

The narrator election algorithm is specialized in narrowing down the best tour guide for this session and the algorithm is executed in the same manner as the narrator election.

## 9. Wait for Others

This is a buffer stage for which the system will constantly check for group completion and queue time limit, while waiting: a group chat and collaboration activities are started between all the attendees until the tour's user capacity is reached or the time limit for the queue reached.

## 10. Start Tour

The tour starts and the system begin the stream.



# Session Election I Provider

The algorithm for electing a provider for a session is computed using simple weighted average that is resulting from the multiplication of each component by a factor reflecting its importance  $\bar{x} = \sum_{i=1}^n w'_i x_i$ .

## Computation Components

The computation will entail the following components scores:

## 1- Sessions Type Score

Telescopia will keep a session count record for the provider to normalize the session type for each provider. For example if a provider was present in 1 OOS and 1 PS and the current session is OOS that provider will have a session type score of 0 and if the current session is GS that provider will have a session type score of 1 etc.

This normalization is essential because the profit from session is widely different, so this score will also normalize the profit for all the providers.

The session type score has a factor of 15.

## 2- Provider's Priority Score

The priority score will normalize the activities across all providers so one provider doesn't attend more than the other in on single day of operation.

To achieve this telescopia will record the sessions attended by every provider and prioritize the one with less sessions.

For example if provider A has attended 3 sessions and provider B attended 2 sessions, the priority score will be computed as 1 divided by sessions count:

Provider A: 1/3

Provider B: 1/2

The provider's priority score has a factor of 15.

## 3- Provider's Physical Location Score

The physical location is a practicality score and will be computed in realtime, for which we determine if the targeted object is observable from the provider's physical location during the session duration.

The provider's physical location score has a factor of 30.

## 4- Provider's Time of Day Score

The time of day is another practicality score and will be computed in realtime, for which we determine if the targeted object is observable at the time zone of the provider during the session duration.

The provider's time of day score has a factor of 30.

## 5- Provider's Location Weather Forecast and Sky Clarity Score

The provider's location weather forecast is another practicality score and will be computed in realtime, for which we determine if weather forecast, humidity and the sky clarity at the location of the provider allows for the session to be completed successfully or not.

The provider's location weather forecast score has a factor of 20.

## 6- Provider's Equipments Score

The provider's equipments is another practicality score and will be computed in realtime, for which we determine if the targeted object is observable using the provider's equipments or not.

The provider's equipments score has a factor of 30.

## 7- Provider's Connection Score

Telescopia will keep a connection speed, uptime percentage during sessions record for the provider to motivate the providers to improve their services, this records will be computed for every session and will start from 100%, the score will be computed from the average of the connection across all sessions attended by the provider, this score will effect their election to sessions heavily, because at telescopia we are obligated to assure the perfect experience for our user base.

The provider's connection score has a factor of 30.

## 8- Provider's Performance Score

This score is on the hands of our users to rate the providers and their performance, so that the under performing provider can improve. The rating will be presented to the user after each session and the score will be computed from the average of user previous ratings. This score will heavily effect the session election of the provider.

The provider's connection score has a factor of 25.

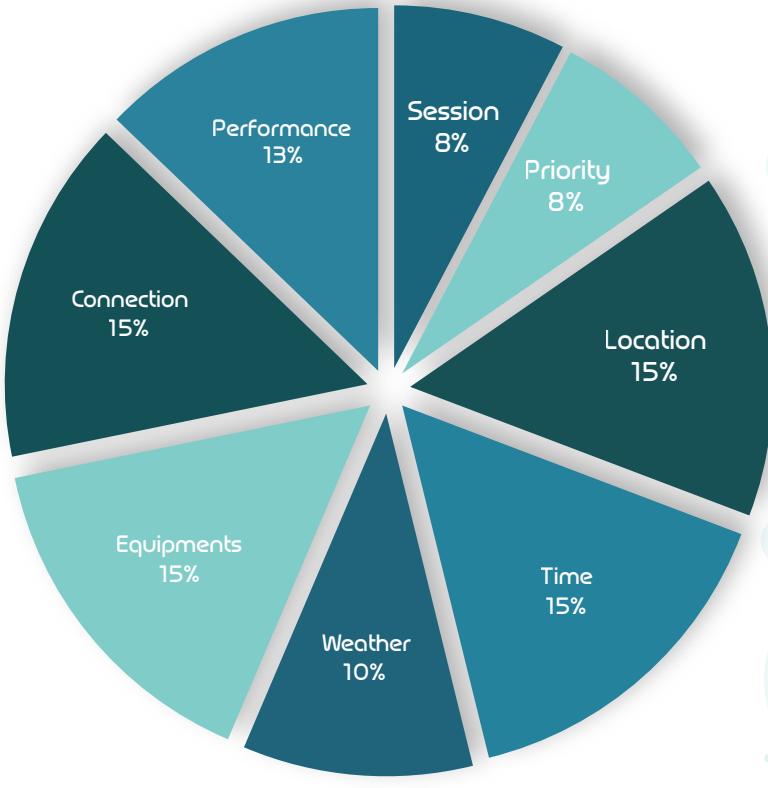
# Results and Conditions

The resulting weighted average will be the sum of all the scores multiplied by its factor for all online providers.

The scores and computational algorithms are 100% automatic and doesn't allow for any manual modification to it. as every calculation will be a transaction in a block chain to achieve much needed transparency in critical algorithm.

The session election score board and history will be visible to all of Telescopia's providers to achieve overall transparency.

All the providers can undergo a testing period for which they can improve their scores and ratings, however this period is available once every 6 months.



# Session Election I Server

The algorithm for electing a server for a session is computed using weighted average.

## Computation Components

The computation will entail the following components scores:

### 1- Session Combined Average User Latency Score

This is a realtime computed score based on the average latency of all the session user to a server.

The latency score has a factor of 15.

### 2- Current Server Load Score

This is a realtime computed score based on the current active sessions on one server.

The load score has a factor of 10.

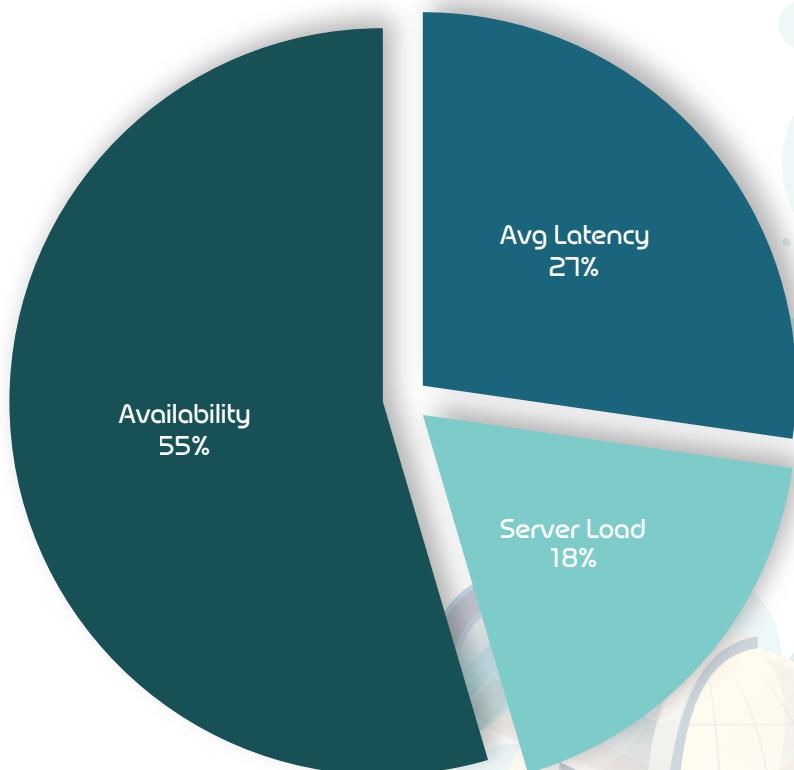
### 3- Availability Score

This score determine if the server is available and not in or will undergo a maintenance during session time.

The availability score has a factor of 30.

## Results and Conditions

The resulting weighted average will be the sum of all the scores multiplied by its factor for all online servers.



The scores and computational algorithms are 100% automatic and doesn't allow for any manual modification to it, as every calculation will be a transaction in a block chain to achieve much needed transparency in critical algorithm.

## Session Election I

Narrator

The algorithm for electing a narrator for a session is computed using weighted average.

# Computation Components

The computation will entail the following components scores:

## 1- Language Score

According to the session language the score will be computed.

The language score has a factor of 30

## 2- Performance Score

This score is on the hands of our users to rate the narrator and their performance, so that the under performing narrator can improve. The rating will be presented to the user after each session and the score will be computed from the average of user previous ratings. This score will heavily effect the session election of the narrator.

The performance score has a factor of 20

## 3- Priority Score

The priority score will normalize the activities across all narrator so one narrator doesn't attend more than the other in on single day of operation.

To achieve this telescopia will record the sessions attended by every narrator and prioritize the one with less sessions in any given day.

The priority score has a factor of 10

## 4- Session Type Score

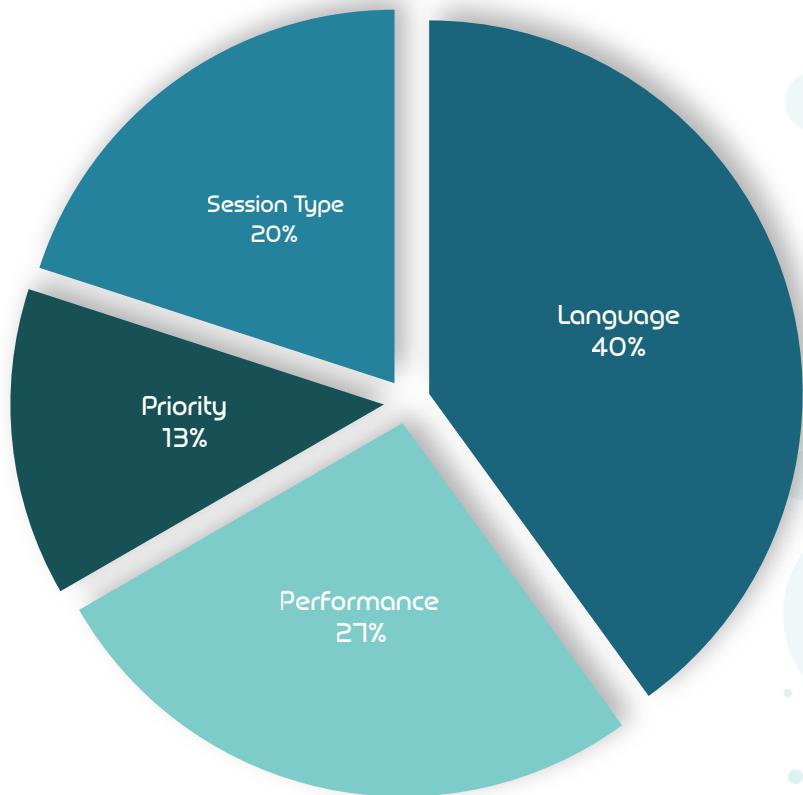
The session type will divide the narrators into groups depending on their knowledge and experience level, so a private session requires a more experienced narrator than an object session.

The session type score has a factor of 15

# Results and Conditions

The resulting weighted average will be the sum of all the scores multiplied by its factor for all online narrators.

The scores and computational algorithms are 100% automatic and doesn't allow for any manual modification to it, as every calculation will be a transaction in a block chain to achieve much needed transparency in critical algorithm.



# Session Making

The system will assemble a group of users based on each session requirements and election results.

The measures for the session making is put in place to ensure lower waiting times for users whom wish to start a session without booking.

Session making is one of the vital algorithms in telescopia api is the session making which takes into account two factors:

## Language

User's first and second preferred language: this will group users whom have common tung to ease the narrator selection process.

## Region

This will group users based on a geographic location in order to decrease the latency and speed up the service, as the OOS, GS, ST, MRST and MRGS all must be in synchronized stream between users.

The combined score of the language and region will allow the system to achieve maximum utilization of the telescopes.

# Utilization

To achieve the balance between profitability and quality, we have to maintain a user cap for all of telescopia sessions, the soft cap defines the minimum technical requirements for the provider, while the hard cap defines the minimum of telescopia's own infrastructure.

A telescope virtually has no limit of how many users viewing it as long as they all share the same object, however only one user can control the telescope at any giving moment.

Therefore the cap for a telescope is splitter based on the usage activity into 2 categories:

- a. Telescope viewing: unlimited.
- b. Telescope control: 1 user.

A commentator, or a guide should require a cap of between 10 and 30 for the in-session q&a and VOIP to be more feasible and not overwhelming and to avoid wasting the session time in never ending questions.

A connection speed cap defines a feasible speed limit for which the providers can easily accomplish and maintain, for this we need to calculate the size of data transmitted from the providers to telescopia CDN servers every second which on average should result in a 3.9 Mbps uplink speed for the provider to upstream the telescope view to telescopia CDN; We should also take into consideration that the common speed a provider can use is the 4G broadband which is able to handle an upload speed that vary anywhere between 2Mbps, to 5Mbps. Therefore the soft cap for the connection speed is 4G broadband.

The session limit for a telescope viewing only sessions should be within the range of 10 - 30 users.

- a. Object Observation Session: 10 Users.
- b. SkyTour and MR SkyTour: 30 Users.

The session limit for a telescope control and viewing session should be limited to 1 user.

- a. Private Session and MR Private Session: 1 User.
- b. Group Session and MR Group Session: 10 Users with control token accessible by the group admin.

Session Type	Users Capacity
Object Observation	10 Users
Private	1 User
Mixed Reality Private	1 User

Session Type	Users Capacity
Group	10 Users
Mixed Reality Group	10 Users
SkyTour	30 Users
Mixed Reality SkyTour	30 Users

# Decentralized Core

## Telescopia Blockchain

Due to the realtime demand of telescopia overall system and given that a public blockchain needs time to mature we have decided to start with a privately hosted blockchain, that in the near future develops into a public blockchain complete with an independent coin to open the mining possibilities thus creating new opportunities with telescopia and its coin.

Telescopia blockchain will work independently from the smart contract and will primarily handle the internal API transaction such as elections, sessions queues, provider verification, marketplace internal transactions, etc.

The blockchain primary function is to ensure the overall system integrity and security.

## Decentralized Database

Telescopia will use a decentralized database in its core, to reduce the overall system latency as telescopia should operate in realtime, we have decided to use a private network of BigChainDB as it will operate in telescopia decentralized file system IPFS on top of its decentralized storage clusters. public BigChainDB will be time expensive in a realtime environment.

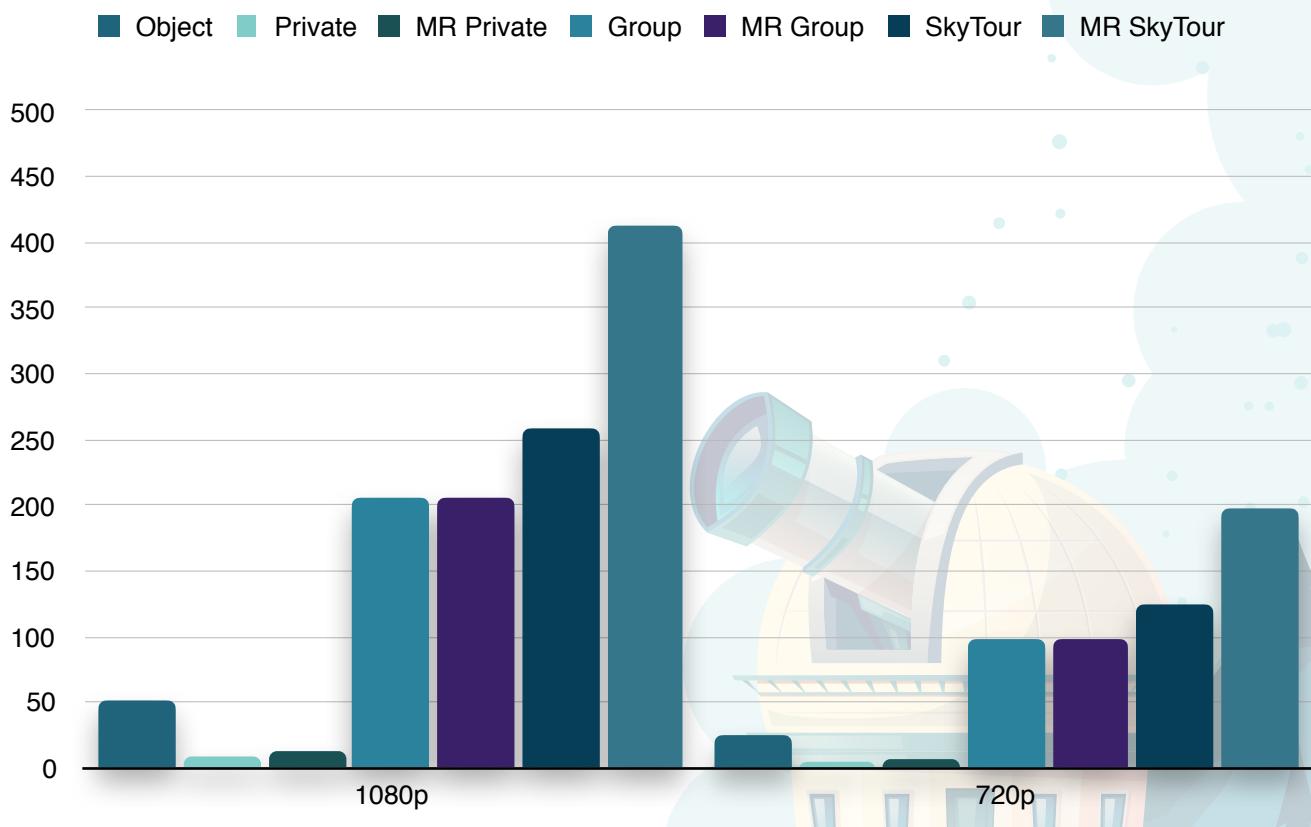
## Compression

Telescopia streams will be compressed with industry standard JPEG and Motion-JPEG that compresses a 1920x1080 frame to a size between 200 KB to 300 KB, telescopia sessions will mostly work with 24 FPS meaning that an object observation session that lasts 15 mins would produce on average a video file size after compression (250 KB frame size): 5,273.4 MB and require bandwidth of 52 GB to successfully up stream for 10 session users.

$$v = \sum_{t=1}^e s_t f_t$$

Where  $v$  is the video file size in KB that lasts from  $i = 1$  to  $i = e$ ,  $s$  is the current frame size,  $f$  is the current FPS.

Session Type	Users Served	Stream Time	Bandwidth 1080p	Bandwidth 720p
Object	10	15m	52 GB	25 GB
Private	1	25m	9 GB	5 GB
MR Private	1	40m	14 GB	7 GB
Group	10	1h	206 GB	99 GB
MR Group	10	1h	206 GB	99 GB
SkyTour	30	25m	258 GB	124 GB
MR SkyTour	30	40m	412 GB	198 GB

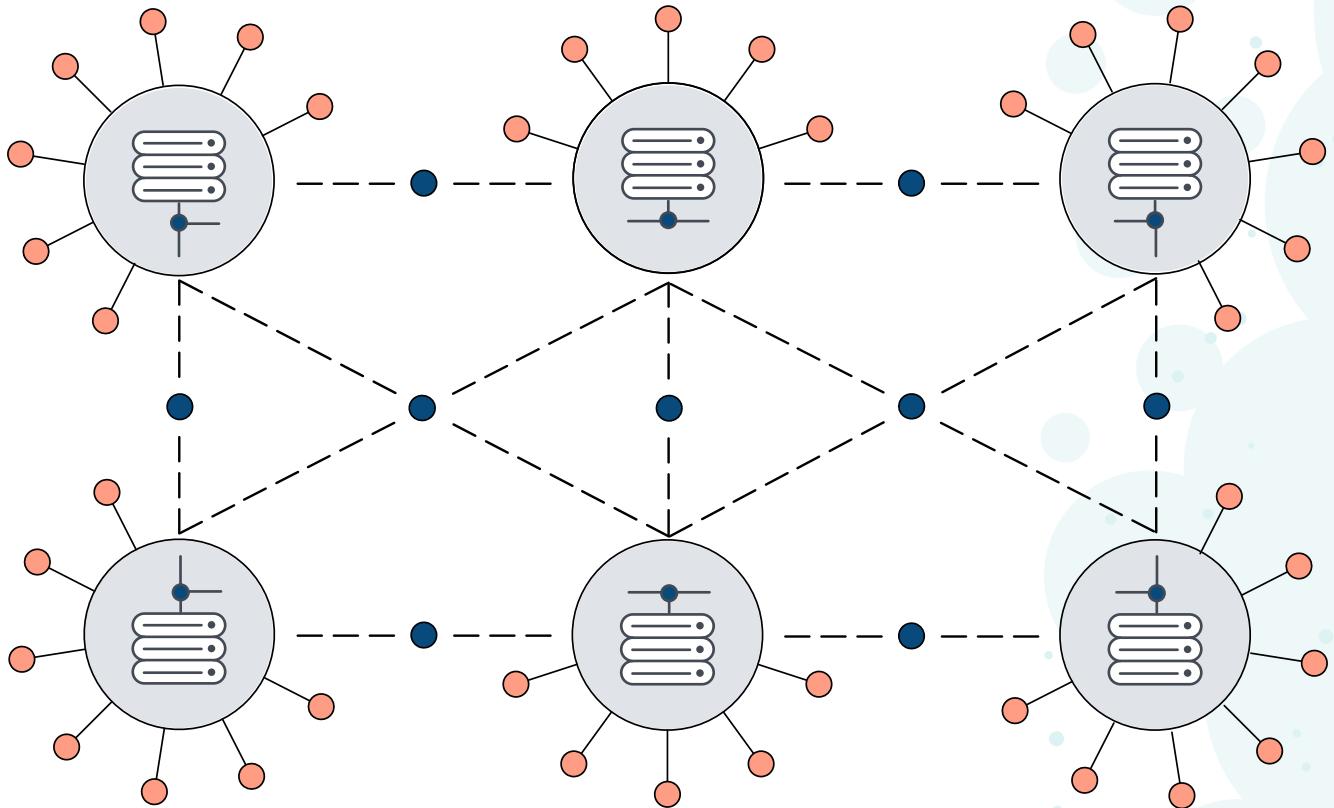


## Decentralized Infrastructure

The system infrastructure has to be able to securely handle the projected maximum number of users and maximum number of concurrent sessions without compromising the system performance and integrity, as the infrastructure is one of the main pillars of user experience and thus success.

Telescopia has designed an infrastructure that will be based on a decentralized network of multiple datacenter scattered strategically to reduce the overall latency and ease the load balancing tasks of the

system, every datacenter is connected to its own CDN and has its share or redundancy to increase the overall stability and security of the system.



To achieve this we need to split the servers into 2 main categories:

- 1- Application Servers: Responsible of executing telescopia code and transactions, handling business logic and executes the big computational requirements of the system.
- 2- Storage/Database Servers: Responsible of storing the sessions recordings and handles the decentralized database transactions and storage.

#### Infrastructure Schema:

We have decided that we will require 6 datacenter one for every continent, except for Australia, will feed its data from Hong Kong datacenter.

Each datacenter will host multitude of servers, load balancers, failover servers, content distribution network, firewalls, storage clusters, etc... For this we need to calculate the system requirements at full load and scale the infrastructure accordingly.

#### Effective Factors:

1. Datacenter Bandwidth Capacity
2. Storage
3. Uplink Speed
4. Processor
5. RAM
6. CDN Bandwidth
7. Redundancy
8. Vendors

We will base our calculation on the overall system throughput requirements over 5 years.

A reserve servers should be available to ensure the system capacity to handle overload, we have decided that we need one reserve application and storage server in each datacenter.

		2019	2020	2021	2022	2023
<b>Users Count</b>	<b>Hourly</b>	20	2,352	7,915	15,585	28,563
<b>Server Bandwidth Capacity</b>	<b>Monthly</b>	56 TB	7 PB	27 PB	60 PB	125 PB
<b>Storage</b>	<b>Recycled Hourly</b>	78 GB	9 TB	38 TB	83 TB	173 TB
<b>Public Uplink Speed</b>		173 Mbps	21 Gbps	84 Gbps	184 Gbps	385 Gbps
<b>Processor</b>		12	28	56	28	28
<b>Ram</b>		1 GB	154 GB	632 GB	1 TB	3 TB
<b>Data Center Count</b>		6	6	6	6	12
<b>Storage Clusters Per Data Center</b>		1	1	2	4	4
<b>Compute Nodes Per Data Center</b>		1	1	2	4	4
<b>Failover and Reserve Servers</b>		2	2	4	8	16
<b>CDN Bandwidth</b>	<b>Yearly</b>	683 TB	81 PB	332 PB	726 PB	2 ZB

IBM Softlayer® is a reliable service provider based on our past 6 years experience and is one of the few that supports CDN to China, another vendor should be chosen from the decentralized providers the likes of Casper CDN etc.

# Timeline Plan

Telescopia plans to make a software release every quarter starting from 2019 to 2023. The timeline illustrates the stages of which Telescopia will incorporate its features over time. This timeline is the results of very carefully planned development timeline.

From the start we will start the development of Telescopia core features to meet with our release timeline as to achieve better financial results.

## Development Timeline

### 2019

In 2019 we will start the development of the core features:

- 1. Telescope Local Services
- 2. Telescopia API
- 3. Web & Mobile Interfaces
- 4. GeoMap
- 5. SkyMap
- 6. Object Session

7. SkyTour

8. Providers

## 2020

In 2020 we will start the development of the main features:

- |                     |                       |                      |
|---------------------|-----------------------|----------------------|
| 1. Private Session  | 4. Mixed Reality Base | 7. Telescope Booking |
| 2. Group Session    | 5. Consultation       |                      |
| 3. Astrophotography | 6. Knowledge Center   |                      |

## 2021

In 2021 we will continue the development of the main features:

- |                   |                          |                              |
|-------------------|--------------------------|------------------------------|
| 1. Public Session | 3. Mixed Reality SkyMap  | 5. Mixed Reality Sessions    |
| 2. Marketplace    | 4. Mixed Reality SkyTour | 6. Scientific Data Analysis. |

## 2022

In 2022 we will start the development of the auxiliary features:

- |                        |                |                              |
|------------------------|----------------|------------------------------|
| 1. Infra-Red Astronomy | 2. LectureRoom | 3. Mixed Reality LectureRoom |
|------------------------|----------------|------------------------------|

## Release Timeline

Our plan is to finalize the release of all the observation sessions within the time period of Q3-2019 to Q1-2021, while releasing the most relevant features to the sessions along the way e.g. Telescopia API, Telescope Local Services, GeoMap, SkyMap, Booking, Providers Incorporation, Consultation Service and Knowledge Center.

## 2019



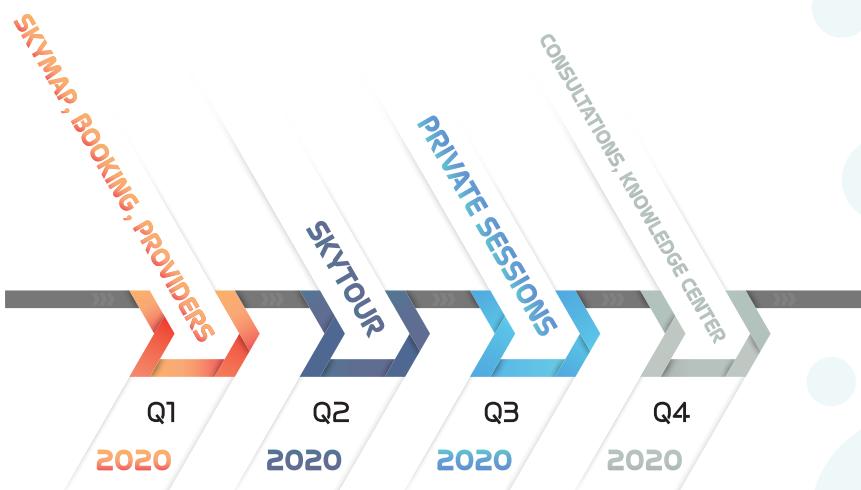
First Quarter: ICO, & Company Preparations.

Second Quarter: API, & Telescope Local Services.

Third Quarter: Object Sessions.

Forth Quarter: DAPP, Web, Mobile, & GeoMap

2020



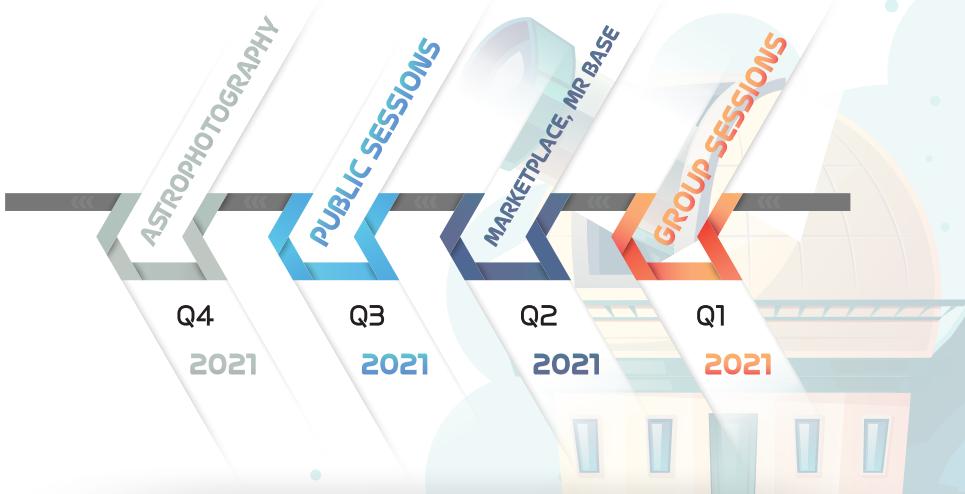
First Quarter: SkyMap, Booking & Providers.

Second Quarter: SkyTour.

Third Quarter: Private Session.

Forth Quarter: Consultation & Knowledge Center.

2021



First Quarter: Group Session.

Second Quarter: Marketplace & MR Base.

Third Quarter: Public Session.

Forth Quarter: Astrophotography.



First Quarter: SkyMap Mixed Reality Mode.

Third Quarter: Sessions in Mixed Reality Mode.

Second Quarter: SkyTour in Mixed Reality Mode.

Forth Quarter: Infra-Red Astronomy Sessions.

**2023**



First Quarter: LectureRoom.

Second Quarter: LectureRoom in Mixed Reality Mode.

Third Quarter: Scientific Data Analysis.

# Provider Economics

# Provider's Session Revenue

As mentioned before in the commission section, the provider session payable is represented by the following arithmetic equation:

$$p = \sum_{i=1}^n R_i - (t_i + m_i + b_i)$$

Where  $p$  is the total provider payable value from the set of attended sessions represented by  $i = 1$  to  $i = n$ ,  $R$  is the total session revenues,  $t$  is the session telescopia commission,  $m$  is the session marketing costs and  $b$  is the total session bandwidth cost.

The table below illustrates the average provider's yearly revenue that commits *3 Hours* daily for *6 Months*, as Telescopia incorporate new features the provider's revenue will increase.

Year	2020	2021	2022	2023
Average Revenue	\$29,186.84	\$40,025.33	\$45,956.09	\$45,956.09

## Payback Period

We have calculated an approximate payback period for *3 Hours* of daily session time for *6 Months*.

## Initial Investment

Item	Description	Unit Price	QTY	Total
Telescope	Celestron EdgeHD 1400 XLT Optical Tube Assembly	\$6,000.00	1	\$6,000.00
Telescope Mount	Celestron CGX-L Equatorial Mount With Tripod	\$3,599.00	1	\$3,599.00
Camera	QHYCCD 290C Cooled USB 3.0 Color CMOS	\$699.00	1	\$699.00
Camera Attachement	HyperStar 14" Edge HD + Filter Slider	\$1,528.00	1	\$1,528.00
Holding	Telescopia Entry Fees	\$1,731.43	1	\$1,731.43
<b>Total</b>				<b>\$13,557.43</b>

## Running Cost

Item	Description	Unit Price	QTY	Total
<b>Monthly Internet</b>	<b>24/8 Mbps Speed, Unlimited Bandwidth</b>	\$66.00	1	\$66.00
<b>Total</b>				<b>\$66.00</b>

\*Telescope Mount Electricity Cost Is Neglectable Due To Lower Consumption of Servo Motors.

According to the calculations above, to become one of Telescopia session providers with good priority in elections, you need to acquire a good telescope, computerized mount, telescope attached CMOS or CCD camera, connection speed and 10000 *CYRS* (according to the ratio 1 *Telescope* = 10000 *CYRS*). It is also necessary to take into account the broadband internet connection.

It means that in order to join Telescopia, the provider has to spend \$13,557 in total the first month. Resulting in a payback period of 6 *Months* on average.

# Cyrus Token

Telescopia issues its own currency unit – Cyrus Token (*CYRS*). It is used in every transaction within the system on any blockchain platform as well as by providers when they acquire a session time.

Cyrus Token (*CYRS*) is the key element of the system and provides the opportunity to perform in-system transactions. *CYRS* is designed to allow greater system flexibility in real time as well as provide grounds for future growth and development of the system.

All *CYRS* tokens will be issued during the ICO. A *CYRS* token may be divided up to 0.00000001 *CYRS*.

## Use Cases

*CYRS* may be purchased, exchanged, sold, leased or rent out.



A token holder can register in the system as a provider. The provider can become a participant in the system by holding an amount of 10000 *CYRS* per telescope. The provider is paid in *CYRS* for participating in Telescopia and meeting technical requirements. The provider as well as any other *CYRS* token holder is eligible to fully dispose of the tokens.

Any Telescopia user may lease his tokens or rent them out to other Telescopia users. If a *CYRS* token is leased, the lessee acquires the right to use the token like users and providers do. The lease is ensured by the smart contract. Lease price is based on market conditions.

## Token Price Support

The CYRS token price is backed by the profitability of services rendered by the provider and Telescopia for the telescopes registered for 10000 CYRS, as well as by CYRS token turnover. When the smart contract registers new telescope quota for existing or new providers, that exceeds the maximum telescope limit while the system minimum utilization is above 70% (meaning that there are big inflow of users on the system), the CYRS quota for telescope will begin to decrease. The purpose of lowering the quota is to encourage new providers thus ensuring there are telescopes always available to the users. Therefore, as the real usage of the Telescopia grows, CYRS tokens will be backed by more and more real assets (telescopes).

## Token Sale and Leasing

The Telescopia smart contract will be based on the ERC20 standard. You will be able to put CYRS tokens on an exchange and sell / purchase them freely.

Many exchange markets also allow their users to lease tokens under flexible conditions. Thus CYRS tokens will be traded and leased on many exchange markets.

CYRS token leasing is a very important financial instrument for the Telescopia economic model. Free circulation of CYRS tokens on exchanges can lead to a sharp increase in the price of the token. This presents obstacles in purchasing CYRS tokens, consequently hindering the development of the service. Leasing remains financially attractive even if the prices on the market are high. The token holder rents them out and thus becomes closer to the break-even point. This scheme is profitable and transparent for both the token holder and the lessee.

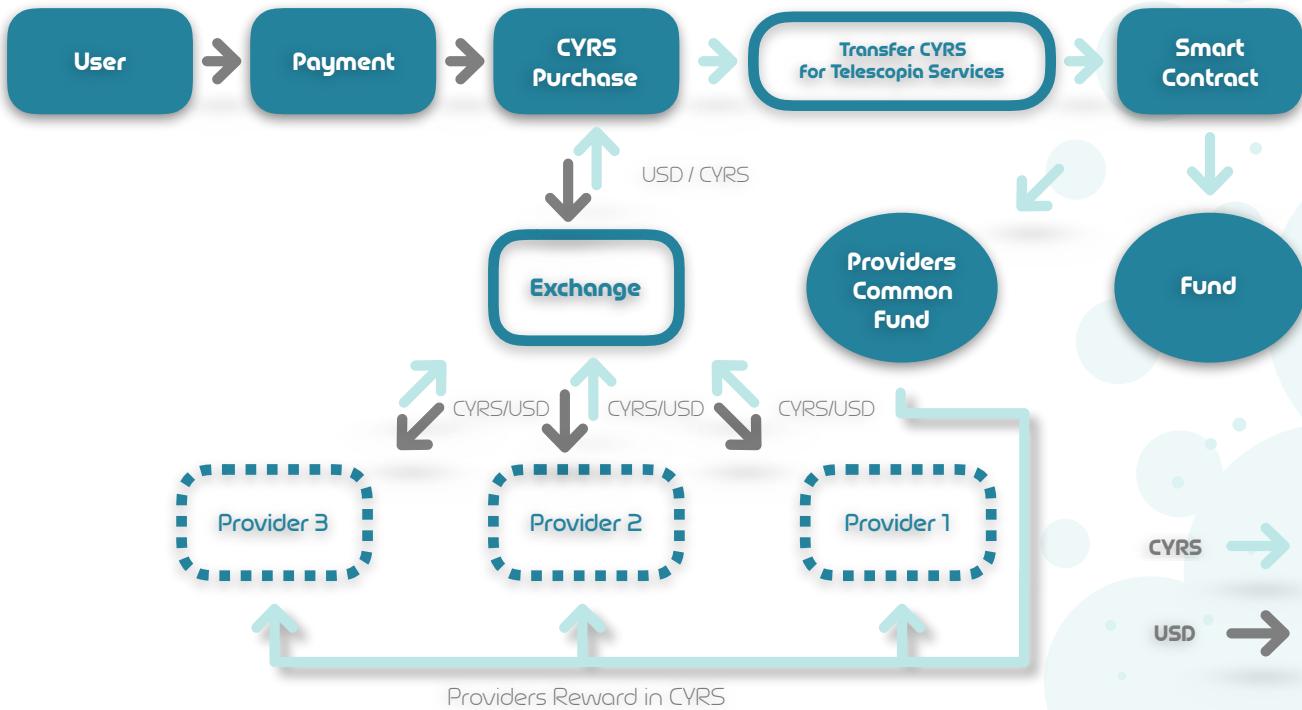
## Reserve Management

Since the smart contract will work with CYRS only, Telescopia will withhold a certain part from incoming fiat payments in order to ensure that the software run normally. The other part will be converted into CYRS according to the current exchange rate and sent to the smart contract. These tokens will serve as a reward for the providers and will be distributed among them according to pricing and depending on their individual contribution to the system. This system will allow the provider to be rewarded in fiat currency and put tokens back in circulation again. The growing number of our investors will encourage token purchases performed by Telescopia. In its turn, this will contribute to the token exchange rate increase.

In order to ensure that the inner financial system is stable, Telescopia reserves a fraction of the tokens 8 % and part of all the funds raised during the ICO. This reserve will help the company provide a fully functioning service at the early stages if providers are not active enough. It will also allow for a more stable CYRS/USD exchange rate.

## Tokens and Fiat Money Movements

Tokens and fiat money movements within the Telescopia:



## Cyrus Token Emission

### Pre-ICO

12 October 2018, we will issue CYRSP tokens for the Pre-ICO with a non-ERC20 contract. The day ICO goes live these tokens can be swapped for CYRS tokens of the operational smart contract that complies with the ERC20 standard. CYRSP tokens will be available for sale with a discount: 1 CYRSP = \$0.19. Hard Cap: \$1,150,000.

The Telescopia smart contract will have an `exchange()` function that allows you to swap pre-ICO and ICO tokens for the operational smart contract tokens.

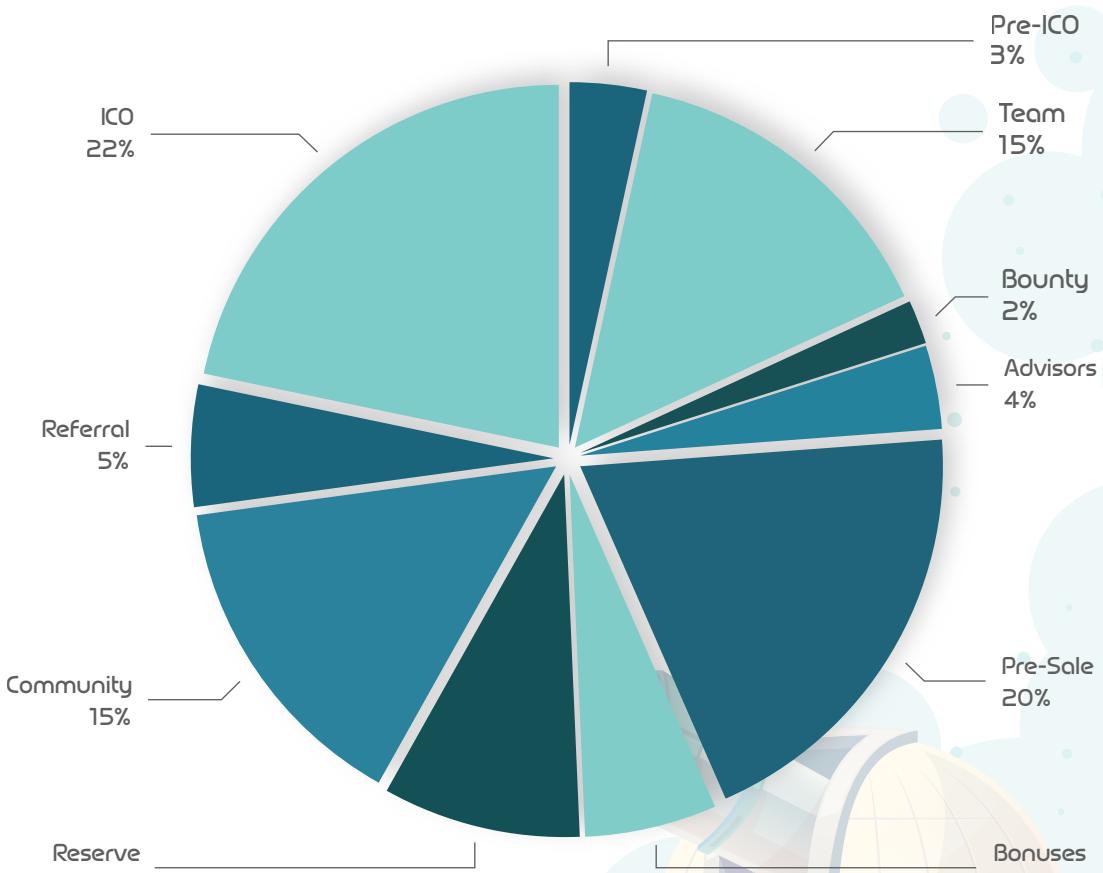
### ICO

Funds planned to be raised via the ICO token sale: \$29,350,000. Soft Cap: \$5,700,000. Tokens will be sold via a smart contract on Ethereum according to the USD / ETH exchange rate that is in force for the token purchase date.

ICO is terminated if: all the tokens are purchased or two calendar months have been passed.

Cyrus Distribution	Cyrus to USD	Cyrus	USD
Pre-ICO	1 CYRS = \$0.19	6,125,000	CYRS \$1,150,000.00
ICO Pre-Sale	1 CYRS = \$0.29	35,000,000	CYRS \$9,975,000.00
ICO	1 CYRS = \$0.48	38,780,000	CYRS \$18,475,000.00
Team	-	26,250,000	CYRS -

<b>Bounty</b>	-	3,500,000	CYRS	-
<b>Advisors</b>	-	3,150,000	CYRS	-
<b>Major Investors Bonuses</b>	-	10,500,000	CYRS	-
<b>Reserve Fund</b>	-	15,750,000	CYRS	-
<b>Community Development Fund</b>	-	26,250,000	CYRS	-
<b>Referral Program and Bonuses</b>	-	9,695,000	CYRS	-
<b>Total</b>	-	<b>175,000,000</b>	<b>CYRS</b>	<b>\$29,600,000.00</b>



## ICO Terms and Conditions

- The ICO is conducted on the Ethereum platform through a smart contract.
- CYRS token emission or mining is impossible after the end of the ICO.
- If we fail to reach the soft cap during the ICO, the raised funds will be returned to investors. Please note that the funds raised during the Pre-ICO are non-refundable.

## Cyrus Value Projection and Holder Privileges

As it was mentioned before, Telescopia plans to list CYRS on crypto exchanges so CYRS/USD exchange rate can be established in live trading where the supply and demand market forces are at play. However, in the long-term the main CYRS growth driver will be the volume of services provided within the system.

Below you can find our understanding of the logic behind establishing a fair CYRS exchange rate that comes from the fundamental factors, such as CYRS distribution among market participants, overall services volume and the quota size for providers per 1 CYRS (hereafter – CYRS capacity).

CYRS value projection was estimated using one of the basic principles of macroeconomics: The Fisher Equation.

$$MV = PQ$$

Where  $M$  is the total money supply,  $V$  is the velocity of circulation,  $P$  is the price level in economy and  $Q$  is the output produced by the economy.

Applying this equation to Telescopia economics, we assume that the money supply  $M$  in our model is the total amount of CYRS in circulation, multiplied by the market exchange rate of CYRS/USD. And  $PQ$  is the total volume of money transactions in the system that rely on CYRS.

$$MRV = T$$

From there we produce the basic equation for CYRS/USD exchange rate projection:

$$R = \frac{T}{MV}$$

Where  $R$  is the CYRS exchange rate,  $T$  is the total yearly USD transaction volume,  $M$  is the total CYRS in circulation and  $V$  is the velocity of circulation.

## Figures Projection

### 1. Yearly USD Transaction Volume.

The transaction volume is the average service price multiplied by yearly user count projected in the financial model. However, it should be noted that Telescopia allows users to pay for services in both CYRS or in fiat money, in which case Telescopia pays for the provider from the CYRS reserve fund, or purchases CYRS on exchanges should this need arise. We assume the fiat to CYRS ratio among the users will be 2:1 on average.

### 2. Amount of CYRS in circulation

This figure represents the CYRS used in transactions within the system, meaning the CYRS that users buy to pay providers for the services and providers sell to receive their revenue in fiat money.

It is important to note that the CYRS in circulation figure is not the total supply of CYRS on the market.

To estimate the volume of these tokens we have to draw up relative categories for CYRS holders based on their characteristics:

- Investors:

Purchased CYRS during the ICO, Pre-ICO or after on exchanges and hold the tokens for long periods of time i.e. from 1 to 5 years. This volume of CYRS is virtually out of the market.

b. Providers:

They reserve CYRS in the system to provide their resources. They also receive CYRS as a reward for their services. Providers may dispose of the CYRS received for the following purposes:

- Reserve further, buy another telescope and increase telescope quota in Telescopia.
- Sell and take the revenue in fiat currencies thus falling under the category of Transactors.
- Hold the tokens to sell later at a higher price, thus becoming Traders.
- Keep the tokens and rent them out to other Providers, essentially keeping their status as providers that reserve CYRS with the exception that the resources are provided by the CYRS lessee.

c. Transactors:

Transactions are understood as CYRS buys and sells that are linked to the system function: users buying CYRS to pay for the services and providers selling the CYRS they earned.

d. Reserve Fund:

The fund keeps a stable number of CYRS. The Fund's CYRS are sold during price hikes to be bought back later and restore the previous amount of CYRS in the Fund. Thus acting as a market maker.

e. Traders:

Those who buy CYRS for speculative reasons, seeking to profit from price difference.

To determine the volume of CYRS in circulation, we deduct the amount of tokens held by Investors from the total amount on the market since these CYRS won't be involved in the system transactions. We assume that during the first year the share of CYRS in this category will be approximately until Investors gradually begin to sell as CYRS price goes up, it decreases by a year to on the fifth year.

We also deduct the CYRS stored in the reserve fund of the system. In the short term, a fraction of this CYRS can be used for market making, however in the long term the amount of CYRS in the reserve must be stable.

A share of CYRS is distributed among providers and traders with the remainder of CYRS circulating in transactions, in fact, that CYRS may be in possession of either providers or users or Telescopia at any given moment.

The amount of CYRS held by Providers is determined by the following factors:

1. Total telescopes in the system.
2. CYRS Telescope Capacity: CYRS reserve for one telescope.

A share of the remaining CYRS is bought and sold by Traders. The size of that share is rather difficult to predict, however, we believe the first year this share will be 94% (during the first year the sessions attended will be rather low, the system will work with a low circulating supply of CYRS at an exchange

rate near the ICO level), while the second year will see that figure go down to 30% and head towards 5% by the fifth year. These CYRS will effectively be put out of circulation as they won't participate in transactions.

The remaining CYRS are in circulation, ensuring the system integrity. It is these CYRS that determine the projected exchange rate against USD.

### 3. CYRS Velocity of Circulation

The turnover ratio of CYRS characterizes the number of times one CYRS can be used in one year. We believe that the first year this ratio will be rather low, as user demand increase and new features released by Telescopia, providers will be keeping their CYRS and holding them in the system as well as new providers will join the system. We predict a gradual increase in turnover up to a figure of 6 by the fifth year.

Our projections are confirmed by benchmarking results – the analysis we ran on trading volume dynamics for tokens of similar projects. The analysis included such projects as NXT and MaidSafe over the period of 2015-2017. The results returned the average token turnover ratio of 1.25 in 2015 and 3.55 in 2016. These parameters were used to model the CYRS exchange rate projections for the first three years of the model; However as those projects yields more revenues due to their nature, our pricing model and target consumer, we have decided to tune the turnover ratio down by a factor of 2. For later periods we believe the ratio will increase by 1 point for the last 2 years on average up to 6 points by the fifth year.

Having used all three variables in the Fisher equation adjusted for CYRS, we are able to project an approximate CYRS/USD exchange rate for the next 5 years considering the conditions present in our financial model.

## Reserve Fund Usage

The project implies the creation of a reserve fund that will consist of a certain amount of CYRS and USD, which is considered one of items of expenditure present in Telescopia financial model.

The reserve fund will be utilized for market making and stabilizing the CYRS price.

## Market Making

Market making implies certain actions taken by Telescopia that directly or indirectly affect the market value of CYRS. It is important to understand that Telescopia market interventions follow strict logic and will be predictable, ruling out any subjective attempts at influencing the value of CYRS by the Telescopia team.

The idea behind Telescopia interventions into the market value of CYRS is based on the following objectives:

- a. Ensure that providers telescope capacities are utilized.
- b. Ensure a CYRS payback period of no longer than 6 months for providers by changing CYRS telescope capacity according to current CYRS price on exchanges.

Telescopia approaches market making using two options:

## 1. Monthly CYRS Telescope Capacity Correction

According to current CYRS price on exchanges and the projected CYRS payback period for providers. In case of an increase in CYRS payback period as a result of an increase in CYRS price, Telescopia increases CYRS telescope capacity to reduce CYRS payback period for providers to its target boundaries.

## 2. Fund Interventions

Since CYRS telescope capacity change cannot occur more often than once a month, in the meantime some imbalances may be observed on the market: an inflow of new users can drive the value of CYRS up, making the payback period longer for providers that in turn can sell CYRS at a higher price. As a result, during a rise in demand providers may begin leaving the system, increasing the load on the remaining providers and destabilizing the entire system. To prevent these risks, Telescopia will use its own CYRS to sell them on exchanges in times of price hikes until CYRS telescope capacity can be changed. In an opposite situation, where CYRS price drops within a month, Telescopia will begin buying CYRS on exchanges using the fund's fiat money. After CYRS telescope capacity changes, providers will either have surplus CYRS (if telescope capacity is increased) or a deficit (if telescope capacity is decreased) that will lead to CYRS price correction. Next Telescopia buys enough CYRS for cheap in the amount required to restore the initial amount of tokens in the fund (or sells back during reverse interventions).

## Reserve Fund Resources

The amount of fiat reserve will depend on the sum raised during the ICO.

Schema	Amount Raised	Fiat Reserve	Reserve Percentage
Soft Capped	\$29,600,000.00	\$5,000,000.00	17%
Hard Capped	\$4,800,000.00	\$1,000,000.00	21%

The amount of CYRS that is allocated to the reserve fund depends on the amount of CYRS sold during the ICO.

Amount of CYRS in Telescopia reserve fund:

Schema	CYRS Sold	CYRS Reserve	Reserve Percentage
Soft Capped	24,864,438 CYRS	117,250,000 CYRS	67%
Hard Capped	126,350,000 CYRS	15,750,000 CYRS	9%

We believe the final amount of CST in Reserve should be between 10% to 20% of the total amount of CYRS issued. Thus in a soft capped scenario with ICO sales of about 50 million CYRS, the share of CYRS in the fund will reach as high as 67%. In this case the surplus CYRS (47%) will be allocated towards market making and gradually finds its way onto the market.

## CYRS Price Forecast

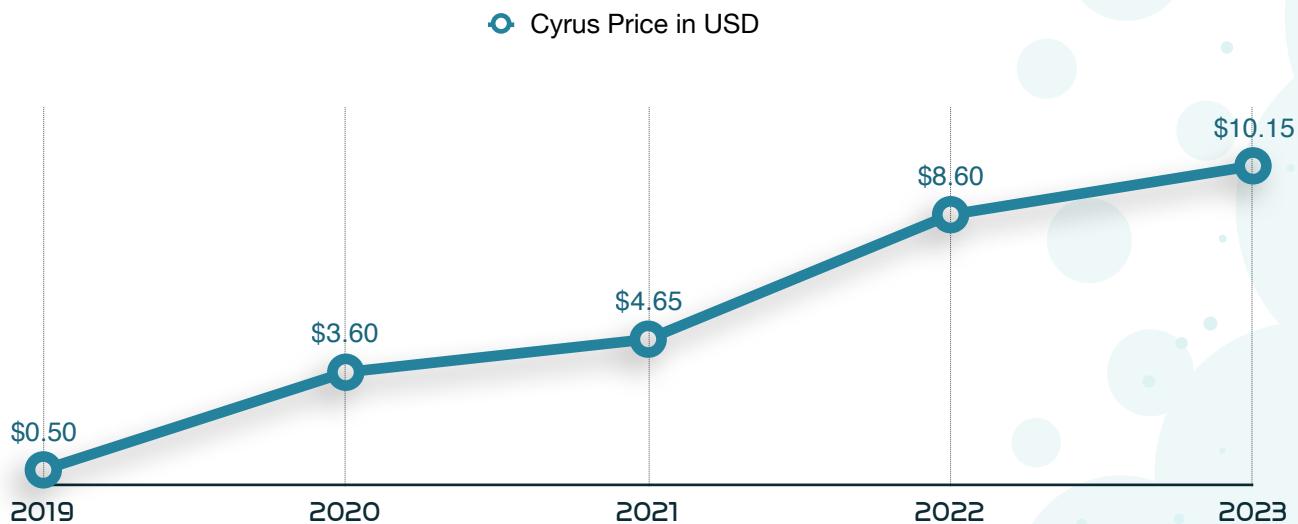
We will illustrate our price forecast and financial model in two schemas (hard capped and soft capped) that reflects the funds raised during the ICO.

## 1- Hard Capped Schema

The table below illustrates the CYRS price forecast over 5 years in the hard capped schema. Telescopia releases main new features every year which is reflected in the average service price.

Figure	2019	2020	2021	2022	2023
<b>Overall System Performance</b>					
<b>Monthly User Count</b>	14,600	1,716,808	5,778,102	11,377,278	20,850,625
<b>Average Service Price</b>	\$3.00	\$9.33	\$10.75	\$17.57	\$17.57
<b>Total Transactions in System</b>	<b>\$525,600</b>	<b>\$192,282,487</b>	<b>\$745,375,169</b>	<b>\$2,398,980,359</b>	<b>\$4,396,503,214</b>
<b>Total CYRS Supply</b>	175,000,000	175,000,000	175,000,000	175,000,000	175,000,000
<b>CYRS in Reserve</b>	15,750,000	15,750,000	15,750,000	15,750,000	15,750,000
<b>CYRS on the Market</b>	159,250,000	159,250,000	159,250,000	159,250,000	159,250,000
<b>Share of CYRS with Investors</b>	90%	70%	50%	30%	10%
<b>CYRS on Exchanges</b>	<b>15,925,000</b>	<b>47,775,000</b>	<b>79,625,000</b>	<b>111,475,000</b>	<b>143,325,000</b>
<b>CYRS Ownership Structure</b>					
1- Providers (Holdings For Telescopes)					
<b>CYRS Telescope Capacity</b>	10,000	2,027	2,153	1,337	1,132
<b>Projected Provider Count</b>	0	2,480	12,920	35,200	55,200
<b>Projected Telescopes Count</b>	18	162	486	1,800	4,230
<b>CYRS Providers Holdings</b>	<b>180,000</b>	<b>5,354,946</b>	<b>28,860,595</b>	<b>49,460,036</b>	<b>67,302,554</b>
<b>Provider Profit from 1 Telescope in 6 Months</b>	-	\$7,296.71	\$10,006.33	\$11,489.02	\$11,489.02
<b>Providers Payback Period</b>	-	6.0	6.0	6.0	6.0
2- Traders					
<b>Share of CYRS with Traders</b>	94%	30%	20%	10%	5%
<b>Number of CYRS with Traders</b>	<b>14,800,300</b>	<b>12,726,016</b>	<b>10,152,881</b>	<b>6,201,496</b>	<b>3,801,122</b>
3- Transactors (Users and Providers)					
<b>System Transaction Volume</b>	\$525,600	\$192,282,487	\$745,375,169	\$2,398,980,359	\$4,396,503,214
<b>CYRS Turnover Capability</b>	0.65	1.8	3.95	5	6
<b>CYRS in Circulation</b>	944,700	29,694,038	40,611,524	55,813,468	72,221,323
<b>Cyrus Price in USD</b>	<b>\$0.50</b>	<b>\$3.60</b>	<b>\$4.65</b>	<b>\$8.60</b>	<b>\$10.15</b>
<b>CYRS Value Increase</b>	-	719%	129%	185%	118%

## CYRS Price Increase Projection in a Hard Capped Schema



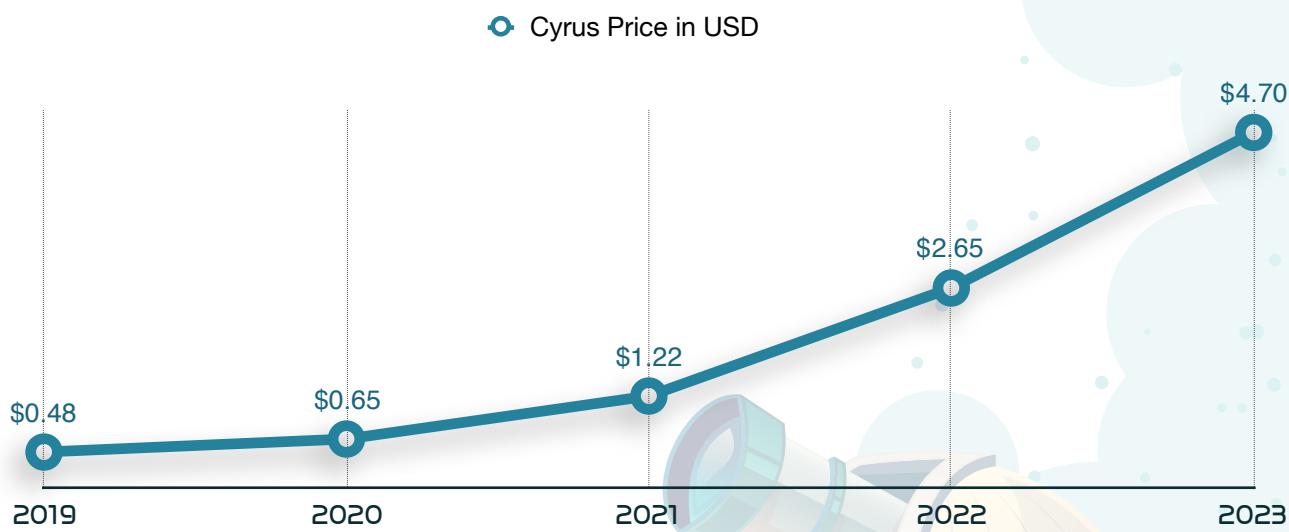
Note the increase in 2020 and 2022 that reflects the release of big milestones: Providers, Sessions and SkyTour in 2020 and Mixed Reality Sessions and Mixed Reality SkyTour in 2022.

## 2- Soft Capped Forecast

Figure	2019	2020	2021	2022	2023
<b>Overall System Performance</b>					
<b>Monthly User Count</b>	0	876,000	1,669,267	4,404,029	8,607,004
<b>Average Service Price</b>	\$0	\$3.00	\$9.33	\$10.75	\$17.57
<b>Total Transactions in System</b>	\$0	\$31,536,000	\$186,957,867	\$568,119,763	\$1,814,848,307
<b>Total CYRS Supply</b>	175,000,000	175,000,000	175,000,000	175,000,000	175,000,000
<b>CYRS in Reserve</b>	15,750,000	15,750,000	15,750,000	15,750,000	15,750,000
<b>CYRS on the Market</b>	159,250,000	159,250,000	159,250,000	159,250,000	159,250,000
<b>Share of CYRS with Investors</b>	90%	70%	50%	30%	10%
<b>CYRS on Exchanges</b>	15,925,000	47,775,000	79,625,000	111,475,000	143,325,000
<b>CYRS Ownership Structure</b>					
1- Providers (Holdings For Telescopes)					
<b>CYRS Telescope Capacity</b>	0	11,252	5,996	3,781	2,443
<b>Projected Provider Count</b>	0	800	4,720	15,600	27,800
<b>Projected Telescopes Count</b>	0	15	450	1,260	3,150
<b>CYRS Providers Holdings</b>	0	9,170,000	30,999,036	63,750,036	75,602,554
<b>Provider Profit from 1 Telescope in 6 Months</b>	-	\$7,296.71	\$7,296.71	\$10,006.33	\$11,489.02
<b>Providers Payback Period</b>	-	6.0	6.0	6.0	6.0

Figure	2019	2020	2021	2022	2023
2- Traders					
Share of CYRS with Traders	94%	30%	20%	10%	5%
Number of CYRS with Traders	14,969,500	11,581,500	9,725,193	4,772,496	3,386,122
3- Transactors (Users and Providers)					
System Transaction Volume	\$0	\$31,536,000	\$186,957,867	\$568,119,763	\$1,814,848,307
CYRS Turnover Capability	0.65	1.8	3.95	5	6
CYRS in Circulation	955,500	27,023,500	38,900,771	42,952,468	64,336,323
Cyrus Price in USD	\$0.48	\$0.65	\$1.22	\$2.65	\$4.70
CYRS Value Increase	-	136%	188%	217%	178%

## CYRS Price Increase Projection in a Soft Capped Schema



Note the increase in 2021 and 2023 that reflects the release of big milestones: Providers, Sessions and SkyTour in 2021 and Mixed Reality Sessions and Mixed Reality SkyTour in 2023.

# Financial Model

Operating expenses are covered with Telescopia profit and the company fixed capital.

Company revenues are all the payments collected for the telescope services sold during one year in the two forms of income: CYRS and US Dollar.

The fixed capital of the company is the cryptocurrency assets raised during the ICO.

## Main Expense Accounts

1. Developers, operators and administrators salaries and associated costs from office rental, equipments and taxes.
2. Project team reward that comprise of 18% of the raised funds.
3. Brand advertisement costs
4. Services marketing costs.
5. Services bandwidth costs.
6. Company's telescopes and equipments.
7. Cryptocurrency exchange listing costs.
8. Fiat reserve fund.

## Company Financial State Factors

The main factors that affect the financial state of the company are:

1. Marketing costs.
2. Direct telescopes offered, this raises the profit of the company.
3. Bandwidth costs.
4. Number of providers.

## Hard Capped Schema

### Profit and Loss Statement in USD

Account	2019	2020	2021	2022	2023
<b>Income</b>					
<b>Service Revenue</b>	420,480	51,830,000	351,613,625	881,803,500	2,307,822,000
<b>Other Income</b>	0	0	0	0	0
<b>Cost of Revenue</b>	0	34,571,141	216,507,094	523,408,500	1,260,564,040
<b>Total Income</b>	<b>420,480</b>	<b>17,258,859</b>	<b>135,106,531</b>	<b>358,395,000</b>	<b>1,047,257,960</b>
<b>Expenses</b>					
<b>Fixed Costs</b>					
<b>ICO Costs</b>	5,221,214	0	0	0	0
<b>Exchange Registration</b>	660,000	1,000,000	0	0	0
<b>Cost of Assets</b>	631,067	344,690	459,901	952,702	1,059,789
<b>Telescopes &amp; Equipments</b>	261,408	2,091,262	4,966,748	21,174,029	40,256,796
<b>Running Costs</b>					
<b>Office Rental</b>	594,000	997,920	1,893,213	4,300,808	8,073,393
<b>Brand Marketing</b>	800,000	1,600,000	2,400,000	3,600,000	5,400,000
<b>Service Marketing Costs</b>	152,351	16,166,648	49,000,550	84,820,650	136,025,467
<b>Payroll</b>	599,445	1,269,265	2,157,493	3,432,485	4,892,257

Account	2019	2020	2021	2022	2023
<b>Payroll Tax</b>	263,796	517,300	820,228	1,243,831	1,699,951
<b>Payroll Insurance</b>	669,110	1,340,234	2,267,170	3,666,238	5,368,472
<b>Staff Extra Expense</b>	76,618	148,678	239,702	377,315	534,162
<b>Running Cost</b>	103,900	152,350	253,670	513,071	891,833
<b>Servers</b>	378,626	914,961	2,863,895	7,678,541	16,289,372
<b>Reserve Servers</b>	63,104	152,493	477,316	1,279,757	2,714,895
<b>CDN Bandwidth Costs</b>	27,331	2,412,241	12,151,806	26,189,640	58,637,534
<b>Contingencies Expense</b>	21,024	2,591,500	17,580,681	44,090,175	115,391,100
<b>Total Expenses</b>	<b>10,522,996</b>	<b>31,699,543</b>	<b>97,532,373</b>	<b>203,319,243</b>	<b>397,235,021</b>
<b>Earnings</b>					
<b>Earnings Before Income Tax</b>	-10,102,516	-14,440,684	37,574,158	155,075,757	650,022,940
<b>Corporate Income Tax</b>	0	0	9,393,539	38,768,939	162,505,735
<b>Net Income</b>	<b>-10,102,516</b>	<b>-14,440,684</b>	<b>28,180,618</b>	<b>116,306,817</b>	<b>487,517,205</b>

## Financing in USD

Account	2019	2020	2021	2022	2023
<b>Operating Expenses</b>	10,102,516	14,440,684	0	0	0
<b>Reserve Fund (Working Capital)</b>	5,000,000	0	0	0	0
<b>Total Amount</b>	<b>15,102,516</b>	<b>14,440,684</b>		<b>0</b>	<b>0</b>

Total amount needed to finance Telescopia in a hard capped schema is: 29.6 Million USD.

## Soft Capped Schema

### Profit and Loss Statement in USD

Account	2019	2020	2021	2022	2023
<b>Income</b>					
<b>Service Revenue</b>	0	31,536,000	70,372,000	422,524,000	1,115,045,800
<b>Other Income</b>	0	0	0	0	0
<b>Cost of Revenue</b>	0	15,531,772	25,252,078	241,714,784	584,526,252
<b>Total Income</b>	<b>0</b>	<b>16,004,228</b>	<b>45,119,922</b>	<b>180,809,216</b>	<b>530,519,548</b>
<b>Expenses</b>					

Account	2019	2020	2021	2022	2023
<b>Fixed Costs</b>					
<b>ICO Costs</b>	1,494,045	0	0	0	0
<b>Exchange Registration</b>	220,000	300,000	0	0	0
<b>Cost of Assets</b>	383,944	132,207	634,897	1,065,009	1,633,033
<b>Telescopes &amp; Equipments</b>	0	525,554	3,665,186	9,944,450	25,642,610
<b>Running Costs</b>					
<b>Office Rental</b>	351,000	532,980	1,893,213	4,300,808	8,073,393
<b>Brand Marketing</b>	450,000	900,000	1,350,000	2,025,000	3,037,500
<b>Service Marketing Costs</b>	0	8,309,955	13,291,508	31,074,084	52,852,081
<b>Payroll</b>	367,825	688,868	5,539,984	18,236,362	77,348,222
<b>Payroll Tax</b>	161,989	277,137	2,486,132	8,002,850	34,509,720
<b>Payroll Insurance</b>	407,518	721,340	5,813,877	18,657,074	78,465,474
<b>Staff Extra Expense</b>	46,867	79,681	678,616	2,167,810	9,230,548
<b>Running Cost</b>	72,760	95,606	253,670	513,071	891,833
<b>Servers</b>	0	457,480	2,863,895	7,678,541	16,289,372
<b>Reserve Servers</b>	0	0	477,316	1,279,757	2,714,895
<b>CDN Bandwidth Costs</b>	0	1,229,904	2,854,665	14,121,427	31,880,939
<b>Contingencies Expense</b>	0	1,576,800	3,518,600	21,126,200	55,752,290
<b>Total Expenses</b>	<b>3,955,948</b>	<b>15,827,513</b>	<b>45,321,560</b>	<b>140,192,443</b>	<b>398,321,910</b>
<b>Earnings</b>					
<b>Earnings Before Income Tax</b>	-3,955,948	176,715	-201,638	40,616,772	132,197,638
<b>Corporate Income Tax</b>	0	44,179	0	10,154,193	33,049,409
<b>Net Income</b>	<b>-3,955,948</b>	<b>132,536</b>	<b>-201,638</b>	<b>30,462,579</b>	<b>99,148,228</b>

## Financing in USD

Account	2019	2020	2021	2022	2023
<b>Operating Expenses</b>	3,955,948	-132,536	0	0	0
<b>Reserve Fund (Working Capital)</b>	1,000,000	0	0	0	0
<b>Total Amount</b>	<b>4,955,948</b>	<b>-132,536</b>			<b>0</b>

Total amount needed to finance Telescopia in a hard capped schema is: 4.8 Million USD.

## Pre-ICO Financial Plan

Our goal is to raise 1,150,000 dollars during the Pre-ICO, the funds will be allocated towards developing a working MVP of the object observation functionality, marketing and world tour conferences. Below is our financial plan during the Pre-ICO period.

Account	Amount in USD
<b>Summary</b>	
Global Marketing & PR Campaign	400,000
Legal	80,000
Business Expenses	80,000
Development	200,000
Roadshow	250,000
Team	140,000
<b>Total</b>	<b>1,150,000</b>
<b>Global Marketing &amp; PR Campaign</b>	
Publications	
Telescopia Publications Preparation	336
Publications in Major English Speaking Media Dedicated to Science, Education, Cryptocurrency and Blockchain Technology	34,483
Publications in Major Russian Media Dedicated to Science, Education, Cryptocurrency and Blockchain Technology	34,483
Publications in Major Chinese Media Dedicated to Science, Education, Cryptocurrency and Blockchain Technology	34,483
Publications in Major Spanish Speaking Media Dedicated to Science, Education, Cryptocurrency and Blockchain Technology	34,483
Publications in Major Arabic Speaking Media Dedicated to Science, Education, Cryptocurrency and Blockchain Technology	12,069
Direct Marketing	
Facebook Advertising	68,966
Contextual Advertising	34,483
ICO Rating	137,931
Outsourced Services Costs	
Open Ledger Service	20,690
Developing Video Explainer About Telescopia for Website	5,172
Content Translation	
Translating Website to Chinese	863

Account	Amount in USD
Translating Website to Spanish	775
Translating Website to Portuguese	775
Translating Website to Hindi	863
Translating Website to Russian	863
Translating Website's Landing Page to Japanese	172
Translating Website's Landing Page to Korean	172
Translating Teoscopia Publications to Russian	517
Translating Teoscopia Publications to Chinese	517
Translating Teoscopia Publications to Spanish	517
Translating Teoscopia Publications to Hindi	517
<b>Marketing Total</b>	<b>424,130</b>
<b>Legal</b>	
Consultation Company, to Provide Full Support in Foreign Jurisdictions	80,000
<b>Total Legal</b>	<b>80,000</b>
<b>Business</b>	
Office Space Rent, One Telescope and Equipment.	60,000
Accounting & Taxation	20,000
<b>Business Total</b>	<b>80,000</b>

# Marketing Plan

Presenting new ideas to an immense market is a huge challenge to undertake. We believe that the market is not bounded as the urge to explore is planted within every and each one of us. We offer Teoscopia in most of the main languages that are spoken around the world. However we are creating a product that has some obvious main consumer groups:

## Consumer Groups

- a. Students, Teachers, Schools and Universities.
- b. Cosmologists, Astronomers and Researchers.
- c. Event Driven Consumers and Photographers.

#### d. Explorers and General Public

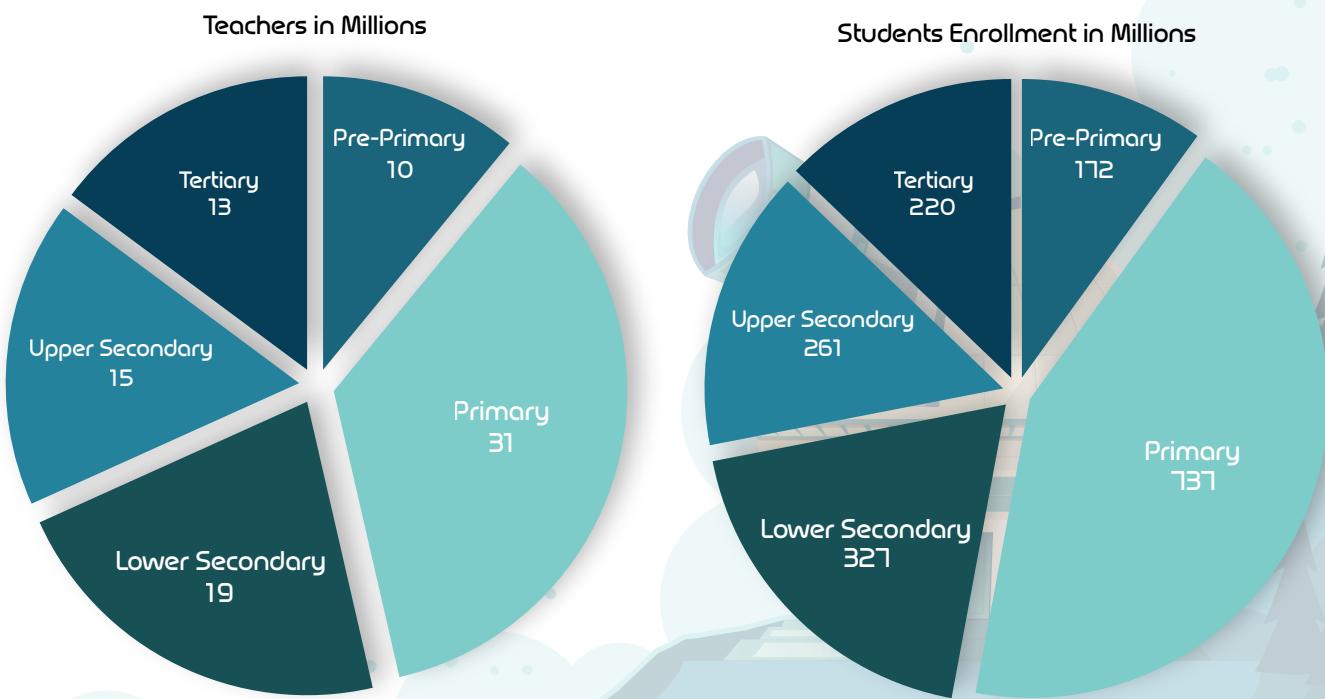
We plan to focus large part of our marketing efforts to group (a) and (b) consumers which will constitute more than 70% of our targeted user base. While group (c) and (d) will constitute the rest of our targeted user base.

## Student and Teacher Programs

According to UNESCO Institute for Statistics there are more than 1.7 billion students currently enrolled in different levels of education and more than 88 million teachers and professors.

Level	Teachers	Students
Pre-Primary	9,706,560	171,546,292
Primary	31,386,054	736,616,070
Lower Secondary	19,349,882	326,849,357
Upper Secondary	14,969,487	261,347,386
Tertiary	13,138,517	220,005,861
<b>Total</b>	<b>88,550,499</b>	<b>1,716,364,967</b>

The graph to the left illustrates the number of teachers throughout the educational levels while the graph to the right illustrates the number of students throughout the different educational levels.



We offer large pool of add-on services that illuminate the educational purpose of Telescopia to students and teachers, as in: Lecture Room, Mixed Reality Lecture Room, Scientific Data Analysis, Discussion Boards and Group Meetups.

Our services are priced with students in mind. On top of the low pricing, we will continually offer discounts and bundles for the students that uses our services.

We plan to reach out for teachers and students around the world using social media marketing and targeted advertisements.

We expect to retain high retention rate from teachers throughout the years, as result we will push the development of their tools and add-on services to make their time spent on Telescopia productive and efficient, thus attracting more and more teachers through organic reach.

## Schools and Universities

According to Webometrics Ranking of World Universities, there are more than 2 million schools, more than 28 thousand universities.

We offer a lower cost and better quality educational tools for schools and universities, we will offer discounted bundles and contracts to this market. This poses more challenge as we have decided to reach the schools and universities via direct sales and marketing.

We expect that this market will grow as the Telescopia grows, because we need to build trust base to achieve contractual level with the universities especially, as a result we will begin the marketing and sales process for schools and universities in 2020, so we can have multiple services they can benefit from.

This group will allow a passive growth of our users as it is contractual based, thus lower running marketing cost in the long run.

## Professional Astronomers and Researchers

According to Webometrics Ranking of World Research Centers there are more than 8 thousand research institute around the world.

This is a harder market to reach for unless a full solution is developed and a stronger equipments are in place, as a result we will start large campaign of marketing to this group starting from 2021, as we will begin using very powerful equipments specially designed for researches.

## Event Driven Consumers, Photographers, Explorers and General Public

This is the main consumer group of 2019 and 2020, as we will drive most of our customers from the urge to explore our vast universe. This consumer group will build influxes during cosmological events that we are going to promote heavily as we can access all the events around the world and offer them to our customers within the comfort of their computers and mobile phones.

We plan to reach for this group using massive social media campaign, starting from early 2019.

## Community Management

In Telescopia we believe in complete transparency, We will make our marketing and advertisement plan transparent during the execution as it is divided into 4 concurrent processes:

1. How we are going to promote Telescopia.
2. Market progress.
3. Marking talent acquisition.
4. Manage our community.

This is how we try to make our marketing spending of the funds raised during the PRE-ICO and ICO more transparent.

We pay close attention to community management. We will do everything we can to make our replies prompt, detailed and clear and we will take your replies into account and make the necessary changes.

To make it more convenient we plan to create official Telescopia social media accounts to post all the relevant information on project development as well as answer your questions.

- A Facebook page in English and Russian, as it is the most popular social network worldwide.
- A Twitter account in English and Russian, as it is very convenient to post updates.
- Official Telescopia chats in WeChat, Kakao and Telegram.
- Project blog on Medium.
- Bitcointalk.org threads.
- Live broadcasts.

We have a well developed technical, financial and marketing plans, implemented financial plan in Odoo and will create a working MVP during the Pre-ICO. That should leave no doubts in our team's ability to finish what we have started.

## What Makes Telescopia Attractive

We are trying to make a technological primitive instrument that is the telescope and offer it to millions of users and students online, to discover, explore and navigate our immense universe. Leveraging the block chain technology in the process, as well as facilitating the development of projects in the blockchain industry.

## Brand Marketing

Starting form early in the ICO stage we will start the brand awareness and marketing campaign to build a fairly large influx of users towards Telescopia, thus building the brand image and establishing a strong presence in the market.

## Social Media Networks Advertisement

Facebook has over 1.9 billion users, Instagram has 700 hundred million and Telegram has 100 million. All these networks serve as the perfect platforms with a variety of effective advertising tools such as the carousel ad format, advertising posts and videos.

These social networks are the primary way to tell the world about the ideas Telescopia has to offer.

## Messengers Advertisement

Messengers are getting more and more popular nowadays, with a lot of original channels providing interesting content which attracts many observant and active subscribers.

One of the most popular messengers in the world is the Chinese app WeChat with over 900 million users. It has become more than a messenger – a whole ecosystem with payment and booking services etc.

- Kakao – is the most popular South Korean messenger with 100 million users.
- Telegram – is a popular messenger actively used by 100 million people worldwide.

These are modern and relevant tools used to deliver your information to the audience that prefers to consume and engross itself in original content.

## Contextual Advertisement

Contextual advertisement is an effective way to reach target audience on the Internet. It is absolutely clear that people usually hesitate to invest in blockchain projects, so it's important to hit the potential user with as many impressions as possible for him to notice our service among all the data noise on the Internet.

The world leading search engines Google and Baidu are the best for contextual advertising.

## ICO Lists

ICO lists are various platforms that provide users with information about dates, token prices, stages and bonuses of upcoming ICOs worldwide. There are many global and local lists helping users to think through all the pros and cons, discuss projects with other users and make decisions.

## Blockchain and Cryptocurrency Media

We cannot ignore some detailed and thorough reviews of our project made by major online outlets covering the world of blockchain and cryptocurrencies on a daily basis. The qualified opinions of journalists will help both to draw attention of Telescopia target audience and to get some feedback from people reviewing projects professionally.

## Meetups, Conferences and Exhibitions

After the ICO we will make a list of the most important global conferences and exhibitions dedicated to the blockchain technology, cosmology and science. Our team will participate in them and will be ready to answer all the questions.

## Venture Funds

Involving venture funds on ICO phase will enable us raising for sure the sum required for development. Therefore, we pay the closest attention to this aspect, which requires not only an idea during ICO, but an elaborated financial and marketing plan and working concept related to the product, which shall leave no doubt that the team is able to bring the affair commenced to the completion.

## Cryptocurrency Exchanges

We know how important it is for token holders to be able to trade CYRS tokens on exchanges as well as profit from its use inside the system. Therefore start communicating with major cryptocurrency stock exchanges: Poloniex, Kraken, Coinbase, Cex, Bitstamp, Bitsquare, Bittrex, Bitfinex, Coinbase, Shapeshift, Bithumb, Bitso, BitBay, YoBit, Exmo, HitBTC, GDAX etc., right after the Pre-ICO is over.

Our official resources will post updates on the partnerships concluded with the exchanges.

## Telescopia Team



**Ahmed el Desouki**

Co-Founder and Chief Executive Officer

- Bachelor degree in Computer Engineering, AAST Alexandria.
- Founder and CEO of the Egyptian ERP and I.T. consultancy agency: Pylux Solutions, LLC.
- 8 years of experience as a Senior Software Developer, Lead Software Engineer and Software Project Manager in CAD and ERP development using C++, Java, Python and PHP.
- I.T. Manager in multiple family owned Egyptian businesses: El Yosr for Cement and Steel Trading and Alex Mix Concrete Factory.

## Marina Boules

Chief Technology Officer

- Bachelor degree in Computer Science, Alexandria University.
- Senior Software Developer with 5 years of experience.
- Developed in multitude of projects including: CAD kernel algorithms, applied neural networks, big-data, and ERP.



## Seif Sabry

Financial Analyst

- Bachelor degree in Financial and Administrative Science, PUA Alexandria.
- Senior Financial Analyst and Consultant with 3 years of experience in ERP (SAP, Odoo) financial consultation.
- Junior Financial Analyst 2 years of experience in corporate finance.

## Osama Shehata

Chief Information Officer

- Bachelor degree in Computer Engineering, AIET Alexandria.
- Co-founder and CTO of the Egyptian ERP and I.T. consultant agency: Pylux Solutions, LLC.
- Senior Network Engineer and Designer with 10 years of experience in data centers design and operation.
- Investor in multiple ICOs and advocate to the cryptocurrency and blockchain community in Alexandria, Egypt.



## Essam Yousry

Telescope Operational Manager



- Bachelor degree in Mechatronic and Robotics Engineering, AIET Alexandria.
- Co-founder and Quality Control Consultant in Pylux.
- Senior Inspection Engineer at Egyptian Refinery APRCO with 9 years of experience in inspections.
- Amateur astronomer with multitude of telescopes and vast cosmology and astrophotography knowledge.



Pylux have dedicated a lot of resources and worked very hard for the past 10 months to research, illustrate, plan and visualize our idea, to achieve a feasible product implementation plan, that we can accomplish a profitable product to us, our providers and our investors.

From the heart of Telescopia team we **Thank You** for your contributions, support and efforts during and after the ICO that is leading our dream to become a reality.

