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CODS-T105

Harlan's world

Equinox: PS-3 comm.system

Problem statement:

Space settlement subtopic 3:

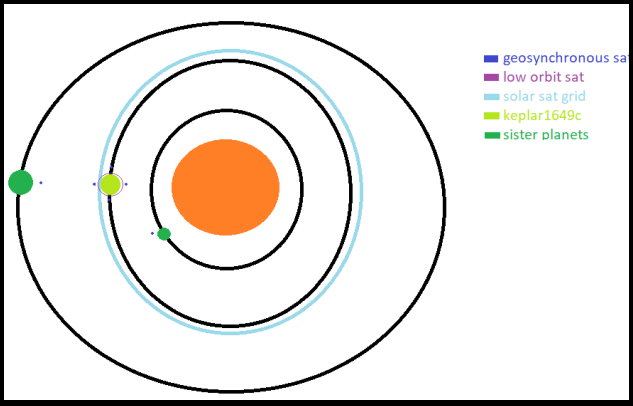
Communication Design

Ideating the communication network within the planet and a cluster of planets.

Harlan’s World

Comm.system

Project name The name Harlan’s World was chosen from the novel Altered Carbon as the protective mesh around the planet Harlan in altered carbon is similar to the kind of network that we intend on installing across keplar-1649c



Project Harlan’s world (HW)

Project HW is basically a grid of balloon radio systems, low earth(keplar1649c) orbit satellites and geosynchronous satellites along with a ring of satellites orbiting the sun and geosynchronous satellites of other planets in the keplar1649’s solar system.

Why choose HW?

As initially it will be hard harvesting resources from the new planet it will be more feasible to have the entire communication system brought to the planet through the cargo spaceships. It is also a top priority to have communications up and running as soon as possible so this method benefits us as we can have specially designed space ships to have the satellites put in place without even having to ever touch down on the planet’s surface. Also, we will have modular units of internet hubs, databases, radio balloon kits and antennas that will be brought down to the planet.

Benefits of HW

Project HW after completion would have installed an internet network much more efficient that the internet present on earth. Not only will it be faster but less prone to failure and provide very high-speed network access to all parts of the planet.

To summaries:

1) Very fast
2) Very reliable
3) Connectivity over the whole planet(s)

(without ever laying down a single wire over the harsh and unchartered terrain of keplar1649 system’s planets)

RESOURCES:

(59) How Does the Internet Work? - Glad You Asked S1 - YouTube

(59) Starlink explained - why SpaceX needs 42,000 satellites - YouTube

STEP BY STEP APPROACH:

STEP 1: Factors that have been assumed.

>We have assumed that the space ships are just arriving to the new planet.>No human has ever been on the planet before.>given the Earth like size of the planet, the gravity will be approximately the same, therefore the orbits for leo and geo sync sats are the same

STEP 2: Setting up the initial communication system.

The first two of many space ships will contain a set of six geosynchronous satellites in one ship and the other will have all the equipment needed on the ground(i.e. internet hub, sat dishes, balloon comms, etc) the ship with the geosync sats are designed to get into a geosynchronous orbit (35,800 Km) of the planet and launch the sats in orbit.

STEP 3: Pioneers on new horizons.

This step (probably the most exciting one) getting the first group of people on the planet. The team will include people selected for other task such as setting up a habitat, researches, etc. but, also a team of communication engineers who will set up a ground control with the already present equipment sent in step 1. This will enable the people of the new planet to communicate with up to 240ms ping.

STEP 4: LEO sats in orbit.

With this step we move on to phase two (setting up a much faster network) all ships carrying cargo to the planet will also contain the leo satellites which will be launched into low orbit in chains of a 100 in multiple levels of orbit (340km, 550km, 1110km) the full phase will be launching near to 50,000 satellites at completion, but at this step a 1000 at 550km orbit will be launched. This will enable the people on the new planet to communicate with speeds between 25-40ms ping.

STEP 5: Compression of project of low orbit sats.

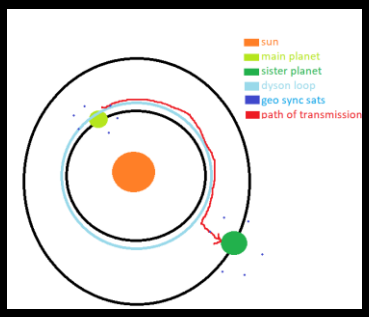
This step is a brief of the whole project of the low orbiting sat network, so with basically every payload sent to the surface of the planet through a space ship a few leo sats are launched into orbit so as the keplar1649c habitat grows the communication networks equally grows in size so by the time the main planets settlement is ready we will have a network nearly zero latency.

STEP 6: The calm before the storm.

With this done we can move on to the next phase of inter-planet communication. Also, this time period will be used to develop the habitat, set up farms, set up resource gathering infrastructure, etc

STEP 7: Dyson loop: solar satellite loop around the main planets orbit

Taking inspiration from the dyson sphere we shall use the same concept to provide connectivity rather than energy. The reason for installing this network of satellites is to slash communication time between the sister planets of the solar system. It will include sofisticated satellites at every 0.5 degree of the orbital path (it may seem less the the orbit of keplar1649c is very small compared to earth due to its red dwarf sun. these satellites will be made on keplar1649c and put into orbit.



STEP 8: Worlds apart

This step would have happened in unison with step 2. While the space ships are reaching the solar system a few would have been sent to the sister planets to have 6 geosynchronous satellites put in orbit

STEP 9: Today is tomorrow

We now are almost complete with our communication network, over time more links would be created and stations on the ground would have to have made a networks between nearby settlements. As this goes on the network will keep perfecting itself and adapting to the given situation(i.e. people of the new system will be developing and develpoing the network as well)

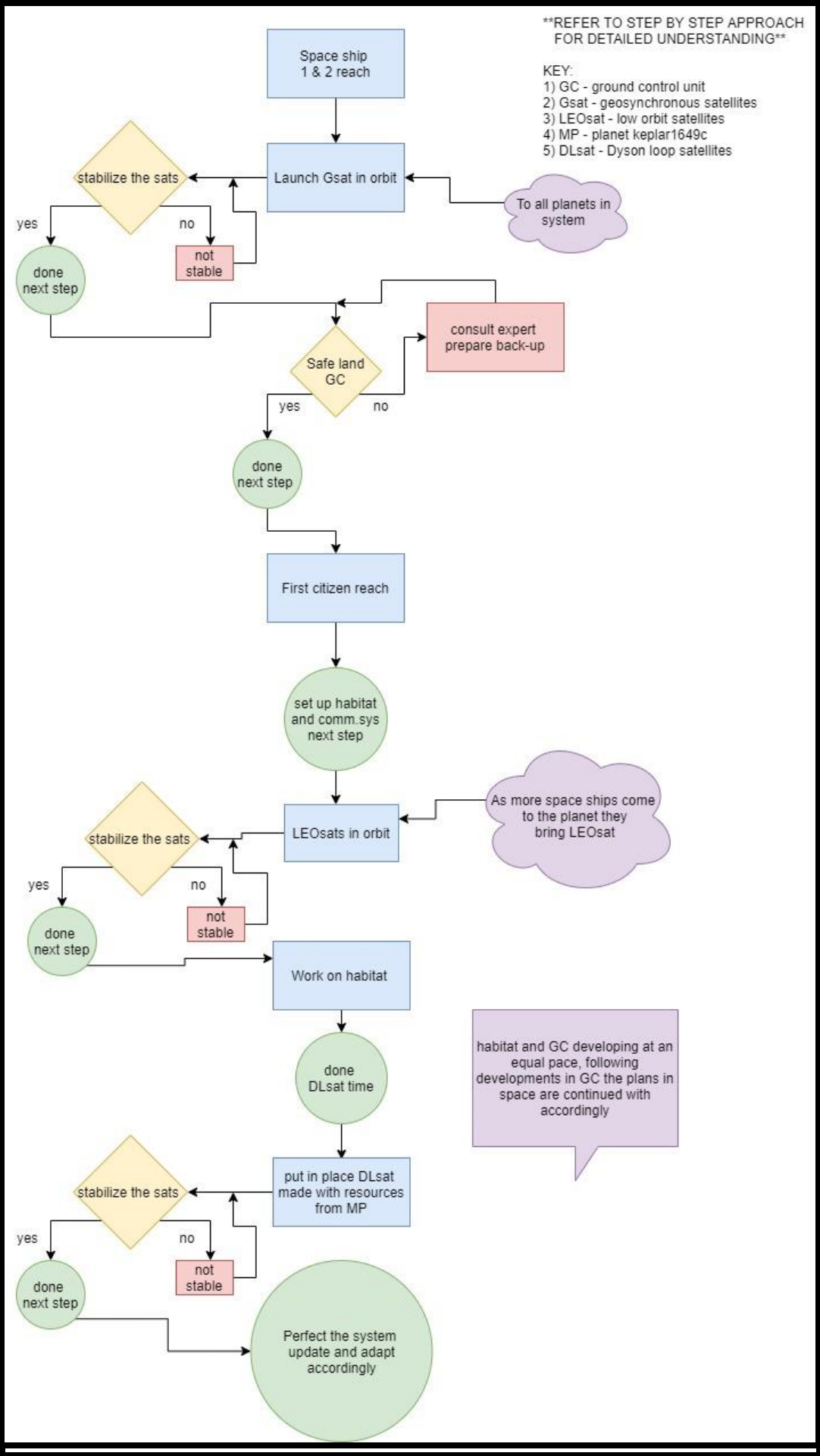
NOTE:

1) All satellites carry advance communication devices, solar panels, thrusters, solar sails, gyrosopic stabilisation systems, temprature control syystems, etc
2) We have a huge mother ship transporting all new citizens, it is the mission control centre and has enough resources to handle most calculated failures during the sat installation process. The ship itself will mostly not ever touch down on any planet, it will be used as a space staion. People will be sent down through “space pods”.

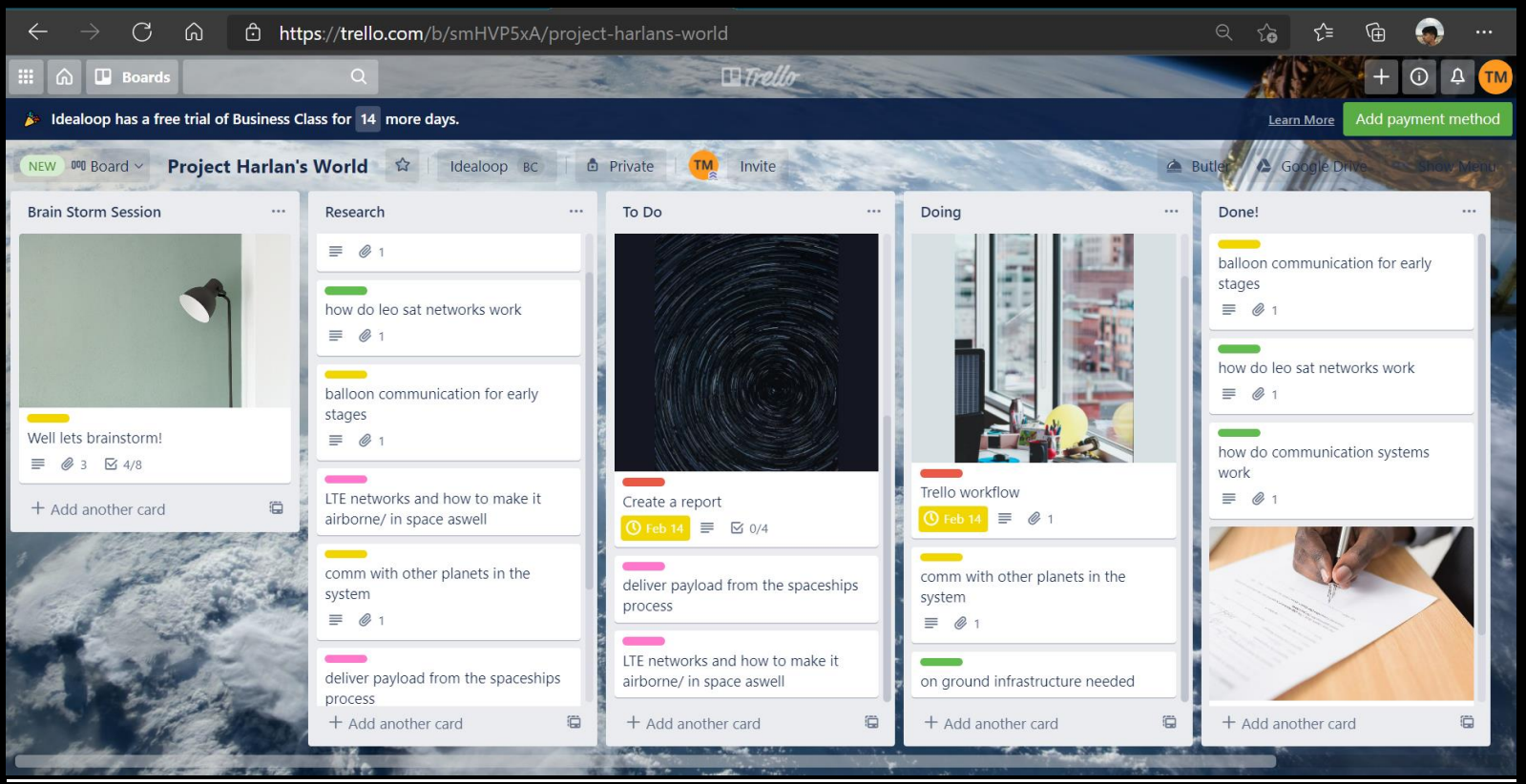
RESOURCES:

Starlink - Wikipedia
Coverage and Orbits (ucar.edu)
Geostationary satellite latency and time delay 240ms - 279ms (satsig.net)
Dyson sphere - Wikipedia

DRAW.IO


REFER TO STEP BY STEP APPROACH FOR DETAILED UNDERSTANDING
KEY:
1) GC - ground control unit
2) Gsat - geosynchronous satellites
3) LEOsat - low orbit satellites
4) MP - planet keplar1649c
5) DLsat - Dyson loop satellites
Space ship 1 & 2 reach
Launch Gsat in orbit
To all planets in system
stabilize the sats
yes
no
not stable
done next step
consult expert prepare back-up
Safe land GC
yes
no
done next step
First citizen reach
set up habitat and comm.sys next step
As more space ships come to the planet they bring LEOsat
LEOsats in orbit
stabilize the sats
yes
no
not stable
done next step
Work on habitat
done DLsat time
habitat and GC developing at an equal pace, following developments in GC the plans in space are continued with accordingly
put in place DLsat made with resources from MP
stabilize the sats
yes
no
not stable
done next step
Perfect the system update and adapt accordingly

TRELLO BOARD



Link to my Trello board:

Project Harlan's World | Trello