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The Space E-wastage Satellites are Rebuilt Process in Earth

G.Pavithra, S.Shobana, S.Sushma, S.Thanapriya, Asst. Prof. R. Saravanan
Department of Electrical and Electronics Engineering
Vivekanandha College of Technology for Women
Elayampalayam,Tiruchengode-637205
gpavithra07008@gmail.com,shobanaseeralaneee@gmail.com,sushmaeee62@gmail.com,priya96ns@gmail.com,saravaa.007@gmail.com

***Abstract* – The report aims at providing patentbased evidence on the available technologies and the patenting trends in the area ofelectronic waste (e-waste) recycling and material recovery waste, while it is intended to providebackground and supporting information to the Partnership for Action on Equipment under the Basel Convention and computing complement .a large number of satellites and spacecraft will be lifted and sent into orbital this year, and this will enhance our understanding of space and other phenomena on process in the earth that impacts us, including climate change, natural disasters, and agricultural patterns.**

With increasing levels of autonomy, there will be a need for remote communication networks to enable communication between spacecraft. Future space missions are envisioned to become more complex and operate farther from Earth which will need to support autonomous operationsimplementing, Inter-satellite communications based on the Open System Interconnection (OSI) model.

***Keywords* – Inter-satellite, e-waste, satellite.**

I. INTRODUCTION

Satellite is powerful long distance and point-to multi point communication system. A communication satellite is an R.F(Radio Frequency) repeater. To overcome disadvantage of Line of sight communication which is only 45 - 55 km, thetransmitting antenna is placed on the satellite and the satellite is placed in the orbit high above the earth. The function of satellite is to communicate between different earth stations around the earth, thus with the help of satellite, it is easy tocommunicate over thousands of km, a com-satellite is a combination of ROCKET to put the satellite in the orbit, microwave electronic devices for the communication, solar cells are used to convert the solar energy into a power supply(ELECTRICAL ENERGY) for the electronic equipment.

Fig.1. orbits.

The satellite placed in GEO- STATIONARY and placed at an altitudeof 22300 miles or 35900 km above the ground level.The satellite travels at the same speed at which the earth rotates around the sun. The rotation of satellite is synchronized with earth rotation as aresult satellite appears to be stationary in the sky w.r.t the earth station constant. There are 3 satellites are placed at angle 120° in GEO-STATIONARY orbit, they provide 100% coverage from one earth station to anywhere on the earth.

II. OBJECTIVES

- Selection of data sources and patent coverage
- Understanding and selection of appropriate patent classifications
- Understanding and selection of appropriate terminology related to the subject matter

According to the data by Union of Concerned Scientists (UCS) which keeps a record of the number of operational satellites, out of 4,987 satellites that revolved around the earth in 2018, only 1,957 are operational. This means currently less than 40% of the satellites that are in orbit are operational.

Existing method:The procedure for the identification of these classifications primarily concernedstatistical analysis of returned patent datasets using defined terminology concerning e-waste,and initial reviews of highly relevant codes. It also helps to provide attitude

control and maintainrelative distance between small satellites.

Link design: Link design analysis relates the transmit to the receive power and shows in detail the feasibility of a given systemThe Space Mission Analysis and Design (SMAD) provides a detailed illustration for link design analysis and is reiterated below:

- Identifying communication requirements - This step involves developing mission requirements includingthe number of satellites, orbital parameters, mission objectives, etc, and also involves identifying thelocation of ground stations and relay stations.
- Determining data rates for inter-satellite links as well as uplink/downlink - (c) Design of each link - Each link (cross links and uplink/downlink)
- Size of the communication payload subsystem - The size of the communication system depends onthe payload antenna con_guration, the size and mass of the antennas, transmitter mass

Imposed by communications:
Some of the next requirementsand constraints are obtained from a link budget analysis considering the mission requirement

1. **However,** the selection of the frequency band is also inuenced by the availability of RF-COTS (Commercial O_-The-Shelf) components. We must also take into consideration the trade-o_ between antenna gain and propagation losses.
2. **Low loss** - Materials and substrates with low dissipation factor (tan _) must be used to avoid degradationof radiation efficiency.
3. **Range** - According to typical spacecraft separation in formation-missions, the maximum rangebetween spacecraft has to be a few kilometers, determined by the orbital characteristics of the mission,which can be different for various constellation configurations
4. **Antenna gain** - The antenna must facilitate communication between spacecraft for the specified inter-satellite distances. These rates range from 10 kbit/s for single-point Global Positioning System (GPS) processing up to 48 kbytes/s for a relative navigation subsystem using a high-update-rate multi - Global Navigation Satellite System(GNSS) receiver .
5. **Duplex method** - Typically, inter-satellite communications require transmission and reception capa-bilities and can be carried out in the same frequency band in order to have a single antenna forinter-satellite links.

For Frequency Division Duplex (FDD) system, transmission and reception bandscan be separated using diplexor or circulator.Time Division Duplex (TDD) architectures, transmission and reception paths are separated using anRF switch controlled timing signals of the communication systems.

Fig.2.SMAD.

III. METHODOLOGY

Constellations used to provide global coverage (e.g., Galileo, GPS, Iridium) are formed bysatellites in different orbital planes with inter-satellite is distances of several hundreds and even thousandsof kilometers.

1. **Directivity** - Given the reduced area of small satellite sides, the e_ective aperture and the achievable gain of the antenna is limited if a single antenna is used. Larger apertures and directivity can be obtained with planar antenna arrays allocated in a single face.
2. **Beam steering** - In case the antenna pattern is directional as in the case of antenna array, the control system of the antenna control unit must steer the beam in the appropriate direction.
3. **Angular coverage** - The use of planar antenna arrays limits the angular coverage, as it is limited by the radiation pattern of antenna elements. For the standard case of using micro-strip patches as elementsof the planar array, the usage angular coverage is limited to _40 degrees around the broadside (normal)direction.
4. **Occupied area** - It compares the area covered by the antenna arrays to the total area of the spacecraft face that can be used for solar panels.
5. **Inter-satellite range** - Longer inter-satellite link can be established using large antenna aperture The larger the antenna aperture, the longer the inter-satellite link that can be established for the same communication parameters (e.g., bit error rate, bandwidth, signal to noise ratio).
6. **Complexity** - Antenna arrays with beam forming require the computation of complex weights under optimization criteria . Thus, a processing unit must be incorporated as part of the antenna subsystem to extract information of the inter-satellite link direction and the calculation of complex weights.
7. **Mission** - Each antenna concept is more adequate for aover space segment architecture. On the this other hand, arrays can also be used in formation missions

with stringent control accuracy.Low-directive are good candidates for missions with relaxed control accuracy requirements and low inter- satellite distances. In general, the collection can be divided into three key concepts:

- Materials that are being recovered and recycled from e-waste streams, items such as plastics and metals
- Sources of e-waste and the processing of these sources, such as batteries, displays, cabling and printed circuit boards
- The processes and logistics involved in e-waste treatment or recycling, such as magnetic sorting, IT related management of recycling systems and similar items.

IV. PROPOSED SYSTEM

Patent protection is territorial; a Swiss granted patent only provides for statutory exclusivity topractice that invention in Switzerland.

China is now the secondary source of activity; however, as figure 9 (timeline of activity by major office of first filing location) shows, this is a relatively new phenomenon. Chinese activity has grown substantially from fewer than 50 new patent families per year prior to 2005, to almost 250 new inventions in 2010

The satellite are used to relaunched in advanced techonology is inbuilt or otherwise the give to special place to useful management in peoples understanding process.

Depending upon the numerous mission applications, the MAC protocols are required to functioning autonomously adapt to several factors like scalability, adaptability, channel utilization, latency, throughput, and fairness.These factors are explained in detail below.

1. **Energy efficiency** .The energy consumed per unit of successful transmission is de_ned as energy efficiency
2. **Scalability and adaptability** -Scalability is as the ability of the network to adapt to the changes in the size of the networkThe MAC protocol should be able to the adapt to such changes in the network size
3. **Channel utilization** - It refers to the effiective bandwidth utilization. The MAC protocol should be designed such that the bandwidth, which is limited, is utilized in an efficient manner.
4. **Latency** - The length of time it takes for a data packet to reach its destination successfully is defined as latency. we need continuous transfer of data, latency should be minimal. Hence, the MAC protocol design should consider the different types of missions.
5. **Throughput** - The amount of data successfully transmitted across the channel in a given time and usually expressed as bytes/second. It depends on numerous factors like latency, communication overhead, channel utilization.
6. **Fairness** - The MAC protocol has to be designed in a manner such that it ensures equal opportunity for all satellites in a network to get access to the channel.

V. CONCLUSION

This survey will serve as a valuable resource for understanding the current research contributions in the growing area of inter-satellite communications and prompt further research in the design of future heterogeneous space missions.

We have proposed solutions to some of the physical layer and different areas data link layer challenges based on of expertise in our research group.We also demonstrated some of the solutions for the challenges faced by the small satellite systems.

This includes implementation of software radio for small satellite systems, designing a modular antenna array for information, and developing feasible multiple access protocols for inter-satellite communications in small satellite systems.

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