

**EARTH BASED COMMUNICATION SYSTEMS AND EMERGING TECHNOLOGIES FOR SUSTAINABLE LUNAR AND SOLAR SYSTEM ROBOTIC EXPLORATION.** Jayashree Sridhar,C-3 Icl Jubilee Apartments, No 16 Second Main Road, Gandhinagar, Adyar, Chennai-600020, Tamil Nadu, India.+91-44-24424969,+91-44-42115269, [jayashree92@yahoo.co.in](mailto:jayashree92@yahoo.co.in)

**Introduction:** The systematic exploration by robotic and human means of Solar System destinations depends upon the foreseeable Future humans who will live and work with new technology .It starts with a new technological idea, via research and development and makes it highly sustainable. Alternative definitions of sustainability are evolving in different contexts, with regard to the environment, science, economics or operations.

**Challenges & purposes:**

Robotic Mission	Space flight transportation	Surface conditions & composition
Human Research	Propulsion & reduction of cost	Production & settlement

**Emerging Technologies:**

These are some of the fast growing emerging technologies which have got wide applications in space exploration.

Biochips	To perform Biological reactions
Bionics	To make robots like humans
Basalt Rock Fibre	Reinforcing material for concrete and for making composites
Nano Technology	Widely used for developing fields like IT, medical, electronics, molecular & robotics
Thermal Barrier Coatings	To sustain high temperatures
Friction less Compressor technology	To make air conditioning, refrigeration
Biomechatronics	For the interactivity of the Biological organs
CNT Flow sensors	To measure the streamline velocities and effect of the drag forces
Biomimicry	The mimicking of biological designs and processes
Light Emitting Polymer	To make flexible displays
Hydroponics	For growing plants with nutrients in water without soil

**Robotic Mission:** My control strategy is to allow a group of mobile robots to position themselves to optimize the measurement and working according to the sensory information with mesh-topology.

The basics of programming robots of the future are based on three main principles:

1. When the interaction between two objects becomes weaker, objects synchronized communication is based on swarm intelligence that runs parallel to one another.
2. The notion of micro-components is strongly connected to the spreading of the code controlled on a macroscopic level.
3. Algorithms need to adapt to certain problems.

**Swarm Robots:** Swarm robotics is a new approach to the coordination of multi-robot systems which consist of large numbers of mostly simple physical robots. Swarm robotics emphasizes a large number of robots, and promotes scalability. The communication can be achieved by wireless transmission systems, like radio frequency or infrared. Using wireless sensor networks and swarm robots the operations can be performed from the earth.

**Analysis of the human perceptual system and its bandwidth limitations:**

Optimal leverage multi-modal input  
Rich non-speech and non-text interfaces  
Simple Augmented Reality Devices  
Hand-held tools to query robots: Tricoder-like device.

**IMPLEMENTING WIRELESS SENSOR NETWORKS**

Communication Networks

1. Network Topology
2. Fully connected networks

**Routing Protocols for Mesh Networks**

1. On-demand Routing
2. Proactive Routing

A group of robots is dispatched over a bounded region of interest. The task is to sample a sensory function over the region. The sensory function is a scalar function unknown to the robots that indicates the relative importance of different areas in the region. Our solution composes an approximation of this function from sensory measurements. A decentralize control law then uses this approximation, as well as neighbour positions, to drive the robots to a configuration such that the sampling of the sensory. Function is near-optimal. This enables the network to record observations about the environment with varying resolution, so that areas with high values of the sensory function receive higher-density data observations than areas with low values.

**Conclusion:** The fragmentary character of our knowledge of the interactions between science, technology, and development and fundamental changes experiencing in these concepts now makes it difficult to derive authoritative and unambiguous conclusions for advances in the field. With the help of these emerging technologies and robots the exploration of solar system destinations can be achieved successfully. Tackling such challenges brings out the best in humanity.

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**References:**

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