

A Concluded Nanotechnology based Spacecraft

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Abstract

In this paper mainly discuss about the nanotechnology where it is to be proposed to make a space shuttle or spacecraft which is fully based on the nanotechnologies where this will be the most advanced spacecraft in the future uses. The main development of this spacecraft deals with the various advantages such as carbon nanotubes reduces the flight weight and the cable design inside the flight. So this will be more efficient spaceship in the advanced future. The cables in the nanotubes were designed by the space elevator which would send information's.

Keywords — Nanotechnology, spacecraft, cable design, spaceship, nanotubes.

I. INTRODUCTION

The nanotechnology based spacecraft is the advanced and efficient craft and it would most probably fit for the future environment. Also this nanotechnology getting improved in various fields such as in medicine, consumer products, sensors, defence, electronics and environmental researches are going. Where our task is to apply the techniques to the fully depends on the space and to invent the about the outer space discovered. Also it is used in medicine and manufacturing industries where in this paper mainly discusses about space.

Also the astronaut's suits also designed with the nano robots where the suit does not get damage while repairing for example in outer space an astronaut goes to repair or check the machine that asteroids or stones may affect the suits and it may cause problems to the person so that time nano robots in the suits gets active and repair the dress quickly as possible.



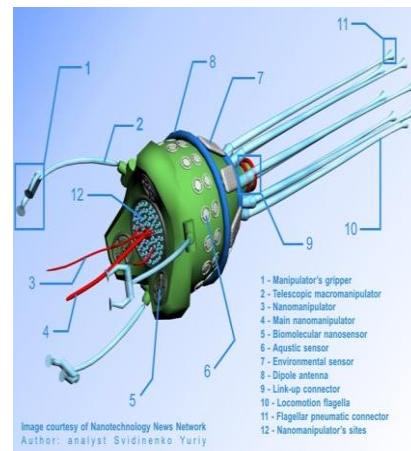
Nano Spacecraft

II. CARBON NANOTUBES

Carbon nanotubes are the important factor of the nano spacecraft system where the carbon nanotubes are used to design for a weightless craft in order travel for longer distances and also carbon nanotubes are used to design the cables of inside the spacecraft for the space elevation system which reduce the cost of sending material into orbits.

III. NANO SPACESUITS

The nano spacesuits are also the another important thing in the nano spacecraft system where this also made with the nano robots that is kept inside the suits of the astronauts for example if the astronauts comes out of the spaceship and check the equipments of the shuttle that time the space suits can get damage by the space stones or asteroids which will create problems to the astronaut so that nano robots are shielded inside the suits.



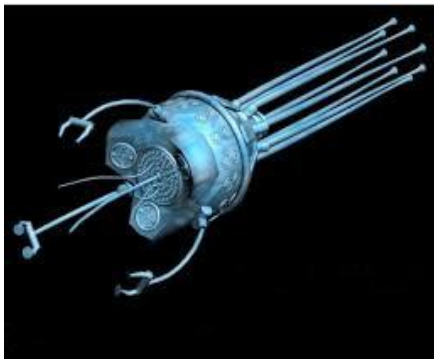
Nano Robots

The figure 2 shows the nano robotic system which would place inside the astronaut spacesuits and these robots will always used to sense the suits of the astronauts. If the damage of the suits can occur at any time in the system and the robots are classified into two types inner nano robots and outer nano robots. The inner robots of nano technology system will get active if the suits get damages and the inner robots will be take inside part of the astronaut whether the astronaut body conditions are analysed & treatment is given.

IV. NANO PLANET SENSORS

Usually nano robots are used for capturing, signalling and transferring information from source to the destination. While these robots are changed for the space in the manner of bio-robots and the main reason for the bio-robots to study & learn the chemical & water treatment of the new planet which are to be researched.

The bio-robots of nanotechnology are made up of bio-components and these components are assembled with the nano robots and there is distributive intelligence programming control is placed and the structure is formed. Finally the automatic and fabrication of image processing is carried out by these nanorobots. This would help the researcher / astronaut to learn the bio status of the planet.

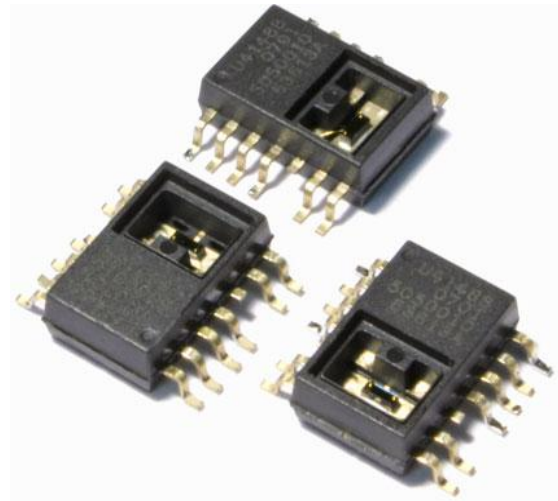


Bio-Components Nanorobots

The bio-component oriented robots are shown in figure 3 where the components are with the sensors which could the results of biological output of the planet which are too analysed.

V. MEMS DEVICES

MEMS are commonly known as Micro Electrical Mechanical Systems where these MEMS are used in the spacecraft to reduce the body and weight of the spacecraft. Usually these MEMS are occurs many processes they are commonly known as Deposition, Patterning, Photolithography and Etching processes. The manufacturing technologies of MEMS are Surface, Bulk and High Aspect Ratio (HAR) Micromachining.



MEMS Devices

MEMS devices can be applied in three ways such as Sensors, Actuator and Structure. Where sensors are the system which would analyse the physical signals and made it would be read or observed. Actuator is a type of motor which would responsible for moving and controlling the system as well as structure also termed as recognition, observation, nature and relationship of entity. MEMS devices accelerate the nano particles of the system where it would reduce the weight of the spacecraft completely by using MEMS the spacecraft will be more efficient & flexible.



Nano Spacecraft

VI. SOLAR CELLS

Solar Energy is known as renewable energy where it gets source form the sun and converts into electrical energy where the carbon nanotubes are composed with solar cells to build light weight solar panels where mirror like structure is formed in order to propel the spacecraft to the longer distance so there will be enough energy to reach its destination.

VII.CONCLUSION

Thus the complete nanotechnology based spacecraft is designed for the future works this would take the research development to the next level and the discovering of new planet in the space environment so this might be very effective

technology when comparing with the other technologies. Carbon nano tubes and MEMS are the important part in this technology where this makes the astronaut free from difficult works and reduce the critical burdens also sensors with bio components are the other important factor in this technologies of nano based spacecraft system.

mechanical resonance of a substrate" (PDF). IBM J. 12: 113–8.

- [19] R. Ghodssi, P. Lin (2011). MEMS Materials and Processes Handbook. Berlin:Springer. ISBN 978-0-387-47316-1.
- [20] T. Polster, M. Hoffmann (2009). "Aluminium nitride based 3D, piezoelectric, tactile sensors". Proc. Chem. 1: 144–7. doi:10.1016/j.proche.2009.07.036.

REFERENCES

- [1] Drexler, K. Eric (1986). Engines of Creation: The Coming Era of Nanotechnology. Doubleday. ISBN 0-385-19973-2.
- [2] Drexler, K. Eric (1992). Nanosystems: Molecular Machinery, Manufacturing, and Computatin. New York: John Wiley & Sons. ISBN 0-471-57547-X.
- [3] Apply nanotech to up industrial, agri output, The Daily Star (Bangladesh), 17 April 2012.
- [4] Saini, Rajiv; Saini, Santosh, Sharma, Sugandha (2010). "Nanotechnology: The Future Medicine". Journal of Cutaneous and Aesthetic Surgery 3 (1): 32–33.doi:10.4103/0974-2077.63301. PMC 2890134. PMID 20606992.
- [5] Cristina Buzea, Ivan Pacheco, and Kevin Robbie (2007). "Nanomaterials and Nanoparticles: Sources and Toxicity". Biointerphases 2 (4): MR17–71.doi:10.1116/1.2815690. PMID 20419892.
- [6] Binnig, G.; Rohrer, H. (1986). "Scanning tunneling microscopy". IBM Journal of Research and Development 30: 4.
- [7] "Press Release: the 1986 Nobel Prize in Physics". Nobelprize.org. 15 October 1986. Retrieved 12 May 2011.
- [8] Kroto, H. W.; Heath, J. R.; O'Brien, S. C.; Curl, R. F.; Smalley, R. E. (1985). "C60: Buckminsterfullerene". Nature 318 (6042): 162–163. Bibcode:1985Natur.318..162K.doi:10.1038/318162a0.
- [9] Adams, W Wade; Baughman, Ray H (2005). "Retrospective: Richard E. Smalley (1943–2005)". Science 310 (5756) (Dec 23, 2005). p. 1916.doi:10.1126/science.1122120. PMID 16373566
- [10] "Nanoscience and nanotechnologies: opportunities and uncertainties". Royal Society and Royal Academy of Engineering. July 2004. Retrieved 13 May 2011.
- [11] Wang, X.; Li, Qunqing; Xie, Jing; Jin, Zhong; Wang, Jinyong; Li, Yan; Jiang, Kaili; Fan, Shoushan (2009). "Fabrication of Ultralong and Electrically Uniform Single-Walled Carbon Nanotubes on Clean Substrates". Nano Letters 9 (9): 3137–3141.Bibcode:2009NanoL...9.3137W. doi:10.1021/nl901260b. PMID 19650638.
- [12] Gullapalli, S.; Wong, M.S. (2011). "Nanotechnology: A Guide to Nano-Objects". Chemical Engineering Progress 107 (5): 28–32.
- [13] Mintmire, J.W.; Dunlap, B.I.; White, C.T. (1992). "Are Fullerene Tubules Metallic?". Phys. Rev. Lett. 68 (5): 631–634. Bibcode:1992PhRvL..68..631M.doi:10.1103/PhysRevLett.68.631. PMID 10045950.
- [14] Dekker, C. (1999). "Carbon nanotubes as molecular quantum wires". Physics Today52 (5): 22–28. Bibcode:1999PhT....52e..22D. doi:10.1063/1.882658.
- [15] Martel, R.; Derycke, V.; Lavoie, C.; Appenzeller, J.; Chan, K.; Tersoff, J.; Avouris, Ph. (2001). "Ambipolar Electrical Transport in Semiconducting Single-Wall Carbon Nanotubes". Phys. Rev. Lett. 87 (25): 256805. Bibcode:2001PhRvL..87y6805M.doi:10.1103/PhysRevLett.87.256805. PMID 11736597.
- [16] Waldner, Jean-Baptiste (2008). Nanocomputers and Swarm Intelligence. London: ISTEJohn Wiley & Sons. p. 205. ISBN 1-84821-009-4.
- [17] Electromechanical monolithic resonator, US patent 3614677, Filed April 29, 1966; Issued October 1971
- [18] Wilfinger, R.J.; Bardell, P.H.; Chhabra, D.S. (1968). "The resonistor a frequency selective device utilizing the