Association for Machines and Mechanisms News Bulletin

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Message from the Editor-in-Chief

Transformation of NaCoMM to iNaCoMM was a land mark change thought of previously, and it became a reality in 2013. Consequent to this, the General Body Meeting of the Association of Machines and Mechanisms (AMM) held on December 18 2013 at Indian Institute of Technology, Roorkee during the iNaCoMM 2013 took a number of decisions which are indicative of changes contemplated in the working of the AMM in future.

After the commendable service of the past office bearers who were instrumental to cause steady progress of the AMM, and finally to transform NaCoMM to an international event, a number of new faces was inducted as the office bearers retaining the experienced ones for their necessary valuable guidance. The editorial board was altogether conceptualized differently, courtesy Prof. S.K. Saha, the then Vice-President of the AMM. The new editorial team constitutes of the Editor-in-Chief and four Zonal Vice-Presidents (ZVPs). I was assigned with the task of the Editor-in-Chief for next four years to coordinate publishing of the Bulletin of the AMM with the active help and support of the ZVPs, and of course, with that of the Secretary. Hope I would be able to satisfy members of the AMM family with the task of publishing its News Bulletin.

Volume 6, No.1 January 2014 issue of the Bulletin was published in due time with the active support and efforts of Prof. S.K. Saha, then Vice-President, Prof. Rajesh Sharma, previous Zonal Vice-President (North), and the Secretary, AMM. I personally thank them for bringing out the issue before completing the formalities of handing over and taking over the responsibilities by the previous and new office bearers respectively. For this April 2014 issue, Dr. R. Ranganath of ISRO Satellite Centre, Bangalore and Zonal Vice-President (South), took the lead role along with the AMM Secretary, Dr. G. Saravana Kumar to publish this issue online.

In this issue, a brief about the AMM, and list of new office bearers and editorial team are included. A contributed article on “Space Robotics: A Brief Overview” is written by A. Kapoor and Dr. R. Ranganath. Dr. G.K. Ananthasuresh has paid a tribute to Prof. K. Lakshminarayana. Report of IPRoMM 2014 is there in this issue. Brochure of the Conference on “Microactuators and Micromechanisms” (MAMM-2014) being held in Romania on October 2-4 2014, is published to facilitate participation of interested persons in this event.

AMM members are requested to contribute articles and send the same to the editorial team. Any constructive suggestion or comments to improve the Bulletin of the AMM are most welcome.

On behalf of the Editorial Team of the Bulletin of the AMM, I heartily thank all concerned for their active support to make this endeavour a success. Wish you all Happy Spring Greetings!

Prof. Santanu Das
Editor-in-Chief

Our Objectives and Activities

The main objective of AMM is to contribute to mechanical design at all levels starting from academic research to industrial initiatives, thereby enhancing the quality and reliability of indigenous machines. With this in view, AMM organises the International & National Conference on Machines and Mechanisms, iNaCoMM, and the workshops on Industrial Problems on Machines and Mechanisms, IPRoMM regularly.

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From the Secretary's Desk

The year 2014 has started with many activities for AMM. It has been a year of fresh starts with a new committee of office bearers taking over AMM's affairs. On behalf of AMM, I thank the previous office bearers particularly the Vice-president Prof. S.K. Saha, IIT Delhi and the Secretary Prof. Sandipan Bandyopadhyay, IIT Madras, who did an excellent job of spearheading the various activities and managing the AMM office over the past few years. AMM also places on record the excellent services of previous Zonal Vice Presidents (ZVP), Dr. Rajesh Sharma, NIT Hamirpur (ZVP North), Dr. K. Panneerselvam, NIT Tiruchirappally (ZVP South), Dr. Subhasis Bhaumik, BESU, Shibpur, Howrah (ZVP East) and Dr. Himanshu Chaudhary, MNIT Jaipur (ZVP West) for managing the editorial affairs of News Bulletin amongst other AMM activities.

The present committee will develop upon the existing activities and start new initiatives so as to expand the reach of AMM. One of the new initiatives currently being purused is to have past NaCoMM conference proceedings indexed with Scopus so that the papers reach a wider audience. Also, to manage the affairs of the AMM's News Bulletin, a separate post of editor-in chief has been created and AMM welcomes Prof. Santanu Das, Kalyani Govt. Engineering College, Kalyani, West Bengal to this post. The new editorial team constituting of the editor-in-chief and the four newly nominated ZVPs have already started their activities. We must thank Dr. R. Ranganath, ISRO Satellite Centre, Bangalore (ZVP South) for taking lead to come up with this second quarterly issue for the year 2014.

AMM members are requested to contribute articles and can write to the editorial team in this regard. This year also started with one of our regular AMM conferences, IPRoMM, that was held at the ITS Engineering College Greater Noida. The AMM official website at URL: www.ammindia.org, will see some changes. It has been planned to make additional AMM forms such as membership update form and documents available online so as to benefit present and prospective members. The new membership process is online and in order to make it completely paper less, we indent to move from DD / Cheque based money transfer to online money transfer accompanied by an email.

On behalf of AMM and myself, I thank you very much for your continued support and wish you a very professionally fulfilling year ahead!

Dr. G Saravana Kumar
Secretary

About the Association of Machines and Mechanisms (AMM)

AMM headquarters are currently located at the Department of Engineering Design, IIT Madras. A new set of office bearers have taken charge of the affairs of AMM. AMM invites both individual and corporate membership from Indian academia, research organizations and industry. Membership benefits and other information about AMM are available at www.ammindia.org. The body of Zonal Vice Presidents (ZVPs) is active over the past several years with representations from the four corners of the country. They are playing the role of nodal agencies so as to decentralise the AMM official activities and to organise workshops under the aegis of AMM to popularise the mechanism science in their respective regions. They also form the editorial team of this news bulletin. AMM invites contributory articles from its members and others working in the various fields of mechanisms science for this quarterly news bulletin. Interested people can contact the editorial team.

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Space Robotics: A Brief Overview

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1. Introduction

Space Robotics[1] is the development of general purpose machines that are capable of surviving the rigors of the space environment and performing exploration, assembly, construction, maintenance, servicing or other tasks. Space Robots are generally designed to do multiple tasks, including unanticipated ones like payload deployment, retrieval, inspections and planetary exploration.

Space robotics has shown immense potential in the recent years due to comparatively lower cost and lower risk factors to manned missions. In addition, it has supported several on-orbit operations to astronauts on-board thus cementing its importance.

Space robotics technology has bifurcated into two main areas: Orbital robotics and planetary rovers. Orbital robotics encompasses manipulation and mobility associated with in orbit satellite servicing. Planetary robotics has the focus on explorations on the surface of the moon and Mars by means of surface mobile robots. By and large, planetary robotics also encompasses explorations on asteroids and comets.

The space environment is hazardous which is characterised by microgravity, radiation, thermal extremes, very high vacuum etc. This provides unique challenges to the robot and robot algorithms in orbital robotics domain. Also issues like electromechanical design and control, locomotion in micro gravity, machine vision related to assembly and inspection combined with disturbing aspects like glare, glint and deep shadows, power and recharging process, radiation hardening, thermal aspects etc. have a major influence in the design of the orbital robots which have to be carefully addressed[2].

For the planetary rovers, in addition to many of the issues of orbital rovers, the surface environment of the planet under exploration poses unique challenges. The transport of the rover to the surface of the planet with or without any atmosphere and the uncertainty of interacting with an unexplored natural terrain are some of the key challenges.

Today, two important devices exist which are proven space robots. One is the **Remotely Operated Vehicle (ROV)** and the other is the **Remote Manipulator System (RMS)**. An ROV can be an unmanned spacecraft that remains in flight, a lander that makes contact with an extraterrestrial body and operates from a stationary position, or a rover that can move over terrain once it has landed. It is difficult to say exactly when early spacecraft evolved from simple automatons to robot explorers or ROVs. Even the earliest and simplest spacecraft operated with some pre-programmed functions monitored closely from Earth. One of the best known ROV's is the **Sojourner** rover (Figure 1) that was deployed by the Mars Pathfinder spacecraft. Presently, several Space agencies are involved in developing **planetary explorers** and **space-based robots.**

The most common type of existing robotic device is the robot arm often used in industry and manufacturing. The mechanical arm recreates many of the movements of the human arm, having not only side-to-side and up-and-down motion, but also a full 360-degree circular motion at the wrist, which humans do not have. Robot arms are of two types. One is computer-operated and programmed for a specific function. The other requires a human to actually control the strength and movement of the arm to perform the task. To date, the

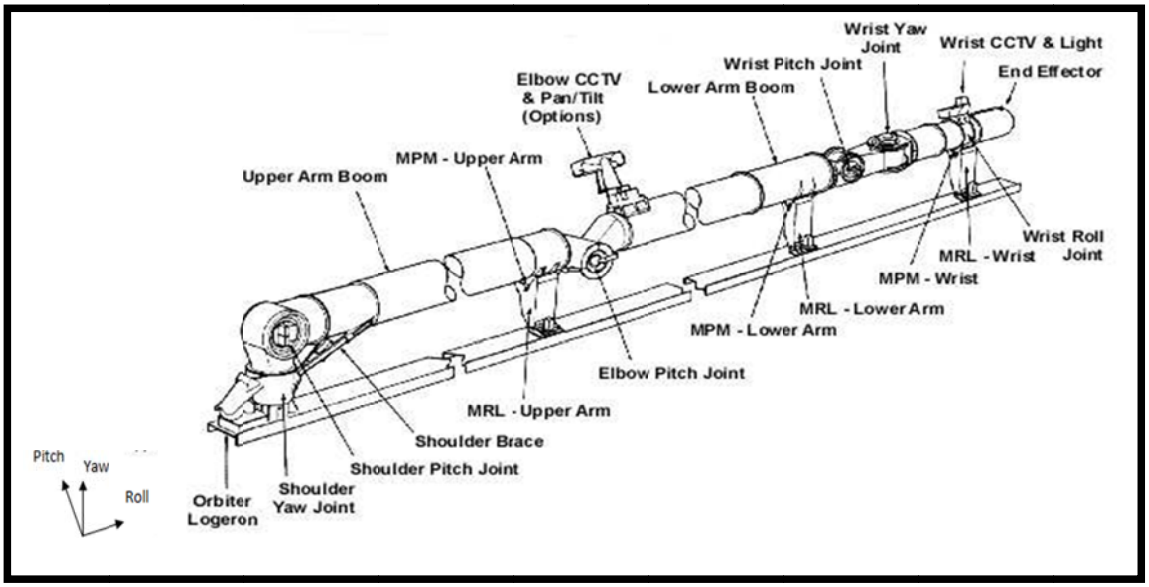
NASA Remote Manipulator System (RMS) robot arm (Figure 2) has performed a number of tasks on many space missions- serving as a grappler, a remote assembly device, and also as a positioning and anchoring device for astronauts working in space.

Figure1: ROV-Sojourner[3]

Figure 2: NASA RMS[4]

2. Remote Manipulator System

(a) Shuttle Remote Manipulator System (SRMS)- The Canadarm1[5]



The Shuttle Remote Manipulator System (SRMS) or Canadarm was a joint venture between the governments of the United States and Canada to supply the NASA Space Shuttle program with a robotic arm for the deployment/retrieval of space hardware from the payload bay of the orbiter. The SRMS is a robotic arm consisting of a shoulder, elbow and wrist joint separated by an upper and lower arm boom giving it a total of six degrees-of-freedom (shoulder pitch and yaw, elbow pitch and wrist pitch yaw and roll). At a total weight of approximately 431 kg, the Canadarm is capable of manoeuvring payloads of up to 14,515 kg at a rate of .06 m/sec with a maximum contingency operation payload weight of 265,810 kg. Under unloaded conditions the SRMS can achieve a maximum translational rate of 0.6 m/sec.

Incidentally, the SRMS is not capable of supporting its own weight on earth and it must be supported by specialized ground handling equipment during its acceptance testing and shipment. The length of the Canadarm is approximately 15 m and a computerized control system can be used to deploy payloads to a positional accuracy of +/- 2.0-in and +/- 1.0-degree of a pre-programmed target zone at the aforementioned rates and load conditions[6]. The SRMS may also be operated manually by the astronauts to the same accuracy with the

use of hand controllers and closed circuit televisions (CCTV) mounted on the manipulator arm.

The End Effector of the SRMS allows the arm to capture stationary or free flying payloads by providing a large capture envelope (a cylinder 20.3 cm in diameter by 10 cm deep) and a mechanism/structure capable of soft docking and rigidizing. This action is accomplished by a two stage mechanism in the End Effector which closes three cables (like a snare) around a grapple probe (knobbed pin) bolted onto the payload and then draws it into the device until close contact is established and a load of approximately 499 kg is imparted to the grapple probe.

The SRMS is covered over its entire length with a multi-layer insulation thermal blanket system, which provides passive thermal control. This material consists of alternate layers of goldized Kapton, Dacron scrim cloth and a Beta cloth outer covering. In extreme cold conditions, thermostatically controlled electric heaters (resistance elements) attached to critical mechanical and electronic hardware can be powered on to maintain a stable operating temperature.

(b) ETS-7 Orbital Rendezvous and Robotic Mission

Engineering test satellite (ETS-7) was developed by NASDA, Japan. It Comprised of a box-shaped 2480 kg main "chaser" bus and a much smaller square panel-shaped 410 kg "target" satellite, the ETS-7's two units separated and recombined in orbit in a series of experiments which enabled NASDA to develop automatic docking systems needed for re-supplying the International Space Station via Japan's future unmanned space shuttle Hope.

ETS-VII is an unmanned spacecraft that is equipped with a 2-m long, six-degree of freedom (6-DoF) manipulator arm[4]. The mission objective of ETS-VII was to test free-flying robotics technology and demonstrate its utility in unmanned orbital operation and servicing tasks. The mission consisted of two subtasks: autonomous rendezvous/docking (RVD) and robot (RBT) experiments. For the RVD experiments, the ETS-VII was separated into two pieces of satellites in orbit. The major piece was named Hikoboshi (a prince in a Japanese classical tale) and performed as a chaser. The smaller piece was named Orihime (a princess in the tale) and acted as a target. Both R-bar and V-bar approaching and docking scenarios were conducted successfully using the global positioning system (GPS), rendezvous laser radar (RVR), vision-based proximity sensor (PXS), and onboard autonomy. Figure 3 shows the ETS-7 Robotic Arm during ground testing & Figure 4 show the configuration of Robotic Arm mounted on the chaser satellite.

Figure 3: ETS-7 Robotic Arm during ground testing[8]

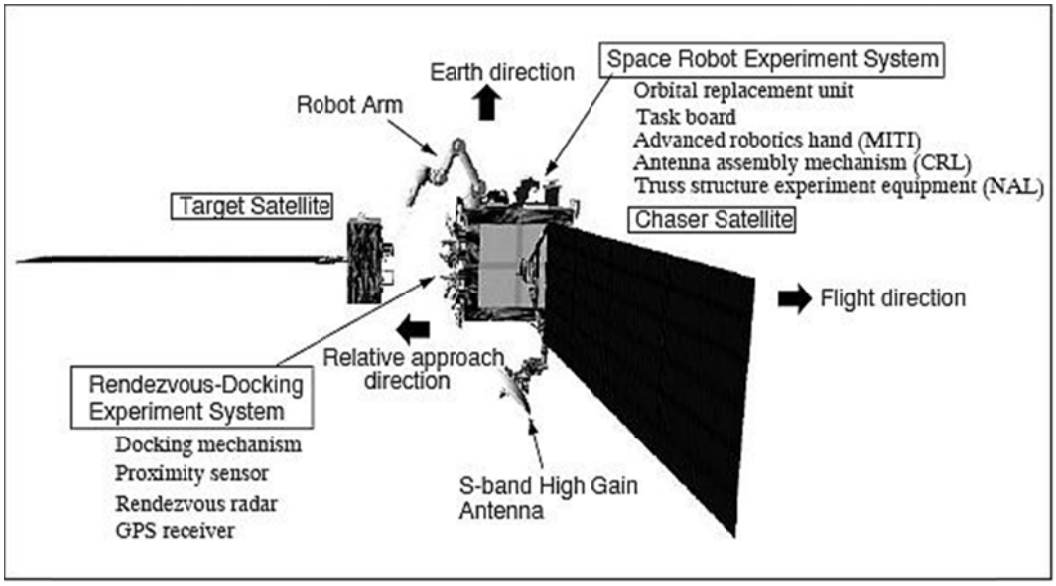


Figure 4: ETS 7- Configuration of Robotic Arm mounted on chaser satellite[9]

3. Remotely Operated Vehicle (ROV)

(a) Mars Science Laboratory Robotic Arm

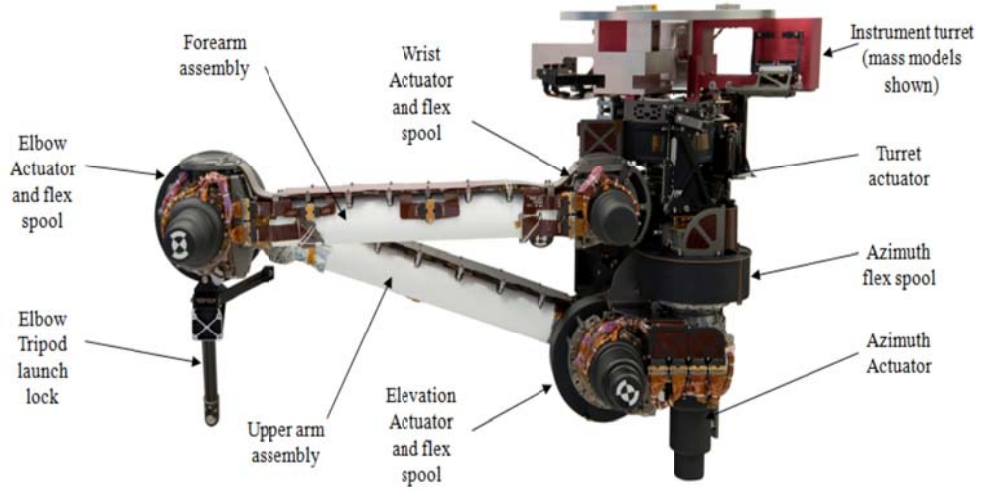


Figure 5: MSL Robotic Arm[10]

The Mars Science Laboratory (MSL) mission was NASA's most ambitious science mission to another planet. MSL incorporates many lessons learned from the Pathfinder mission and Sojourner rover, the twin Mars Exploration Rovers (Spirit and Oppurtunity), and the Phoenix Lander.

The Robotic Arm (RA) was a key part of the Sample Acquisition, Processing, and Handling (SA/SPaH) system. The MSL Robotic Arm (Figure 5) was responsible for accurately placing the 5 turret-mounted instruments on their respective targets and acquiring samples. These instruments are a drill capable of capturing rock samples, Mars Hand lens Image (MAHLI) camera, Dust Removal Tool (DRT), Alpha Particle X-Ray Spectrometer (APXS), and Collection & handling for *in situ* Martian Rock Analysis (CHIMRA). After a sample has been acquired by the drill or the scoop on the CHIMRA, the sample was transferred to the CHIMRA processing unit and use gravity, assisted by induced vibration, and coordinated movement of the RA to process samples to deliver to the rover-mounted science instruments for soil tests.

The MSL rover (Figure 5) carried the most advanced payload of scientific gear ever used on the Martian surface, a payload more than 10 times as massive as those of earlier Mars rovers. Its primary scientific goal was to investigate whether past conditions had been favourable for microbial life and to accomplish acquisition and handling while preserving clues in the rocks about possible past life.

The main attributes of the MSL Robotic Arm are:

- 5 degrees of freedom
- 2.2 meters outstretched length from base to center of instrument turret
- 67 kg mass without turret instruments
- 5 turret instruments with mass of 34 kg
- Electrical cabling system with 920 signals traversing the length of the arm
- Two dual-use caging mechanisms capable of surviving landing loads of over 20g, passively re-stowing the RA after deployment, and surviving rover driving loads of 8g
- Capable of surviving temperature range of - 128ºC to +50ºC and operating within a temperature range of -110ºC and +50ºC.

Figure 6: MSL Rover[11]

A brief summary of various planetary missions and spacecraft berthing missions are illustrated in Table1 and Table2.

Table 1: Summary of Various Planetary Missions

Name of the Mission	Year	Robot Configuration	Functions
Viking	1976	Boom Length : 3m Boom Diameter: 6.2 cm DOF: 4 Sampling head size: 4.8 cm End Effector: Surface sampler	• Perform biochemical tests • Dig, insert instruments into the soil, grab samples, sieve the dirt • Deliver samples to a variety of instruments.
Mars Polar Lander	1999	DOF:4 Reach : 2.2 m End Effector : High capacity scoop Scoop Capacity: 500cc	• Obtain samples and send it to onboard analysis module.

Table contd/- to next page

Name of the Mission	Year	Robot Configuration	Functions
Mars Surveyor	2001	DOF: 4 Reach :2m radius sphere Mass : 5 kg End Effector: sampling scoop, scraping blades, electrometer and a crowfoot for deployment of rover.	• Dig and access depths of up to 50 cm. • Robotic Arm camera for continuous imagery and observation of the landing site and surroundings.
Rocky 7	Prototype, precursor to Mars Exploration Rover (MER)	DOF : 2 Length: 32 cm, Mass :650 g End Effector: Sampler, Spectrometer	• Sample Digging, dumping and acquiring data for spectrometer.
Mars Exploration Rovers – Spirit and Opportunity	2003	DOF: 5 Reach: 90 cm Rock Abrasion Tool :<720 g End Effector: Instrument Module	• Hold and manoeuvre the scientific instruments to the required positions with respect to rock and soil for analyses[5].
Mars Phoenix	2007	DOF: 4 Length :2.35 m End Effector: Sampling scoop, spectrometer	• Digging trenches, acquiring water -ice samples and transferring it to the on-board labs for detailed analyses.
Mars Science Laboratory	2009	DOF : 5 Length : 6 feet End Effector : Surface sampler, Instrument module	• Placing science instruments in contact with Martian surface • Collecting samples by digging the soil and drilling rocks.
ExoMars	2011	DOF: 5 End Effector: Corer/grinder tool, spectrometer, instrument module	• Positioning of instruments against rocks, target surfaces for retrieval of samples.

4. Conclusion

In this article, the domain of space robotics, its challenges and utility have been addressed. The salient aspects of a few space robots have been illustrated. A brief summary of various planetary robots and robots used for berthing operations in space have been tabulated along with references.

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Table 2: Summary of Various Berthing Missions

Name of the Mission	**Year**	**Robot Configuration**	**Functions**
ETS-7-Orbital Rendezvous & Robotic Mission(JAXA)	1997	Robotic arm Length: 2m DOF: 6, Mass of Robot= 45kg Payload capacity: 400 kg	• Capturing & berthing of a target satellite • Assembly • Deploy & retrieve a space structure
Orbital Express	2007	Robotic arm Length :3m DOF: 6, Mass= 71kg Payload capacity: 250 kg	• Free-fly capture • Component replacement • Propellant transfer
Dextrous Robotic arm(ESA)[13]	Under develop-ment	Robotic arm Length :1m DOF: 7, Mass= 20kg Payload capacity: 500 kg	• Servicing of space station platforms
JEM Remote manipulator system(JAXA)	2008	Robotic arm Length:10m DOF: 6, Mass = 20kg Payload capacity: 7000 kg	• Handling & assembling payloads • Capturing & berthing operations
European Robotic arm(ERA)	2012	Robotic arm Length:11m DOF: 7, Mass = 630kg Payload capacity: 8000 kg	• Installation & deployment of solar arrays • Handling of P/L • Support of astronauts during space walks
SSRMS(Canada Arm-2)	2001	Robotic arm Length :17m DOF: 7, Mass= 1800kg Payload capacity: 116000 kg design load	• Station assembly & maintenance • Support of astronauts during space walks
SRMS(Canada Arm-1)	1981	Robotic arm Length: 15m DOF: 6, Mass= 410kg Payload capacity: 29484 kg design load	• Capture stationary or free flying P/L • Station assembly & maintenance

A Tribute to Professor K. Lakshminarayana (1938-1997)

Association for Machines and Mechanisms has a memorial lecture in the name of Prof. K. Lakshminarayana. This lecture is delivered by an eminent researcher at the biennial National Conference on Machines and Mechanisms. In this brief article, we remember the life and work of Prof. Lakshminarayana. Much of the content was prepared by his son, Dr. Eswar Kalluri. I have only edited it and added a little based on my own recollections of working with Prof. Lakshminaraya on my undergraduate capstone design project at the Indian Institute of Technology, Madras, Chennai, and with inputs from Prof. Kurien Isaac.

K. Lakshminarayana was born on October 12th, 1938, in Tenali, a town in Andhra Pradesh, India. His father, Dr. K. Bhimeswara Rao, was a physician (general practitioner and obstetrician). His mother was K. Ratnamanikyamma. He displayed an affinity for mathematics at an early age. Occasionally, he would help his sister, older by two years, with the problems at her grade level. Another talent he had was in drawing botanical and other scientific sketches. His handwriting was beautiful in both English and Telugu. His students, who took his kinematics course much later in his life, will vouch for this fact. He would usually fill up the board with beautiful line drawings of linkages and would complement them with equally elegant equations and text.

After completing his schooling as the top-ranked student at the local high school, he went to Guntur, a nearby town, for his Intermediate (11th and 12th standard) studies, with an emphasis on the sciences. He was initially enrolled in a biology course following his father's desire for him to eventually become a medical doctor. However, after a short while, the mismatch was corrected and he took up mathematics instead. It was natural for him to pursue engineering studies next. He was selected in 1955 for admission through the first ever entrance examination for the Indian Institute of Technology (IIT). He received his B.Tech degree in Mechanical Engineering in 1959 from IIT, Kharagpur. He was one of only six students in his class receiving purely merit-based scholarships. He continued at IIT, Kharagpur and completed the M.Tech programme in Mechanical Engineering in 1960.

Between 1961 and 1963, he worked in Bombay as a Design Engineer at Dynacraft and Godrey & Boyce. At this time, he developed an interest in mechanisms and wanted to do research in the area. He joined the Mechanical Engineering department at IIT-Madras on October 11, 1963 as a lecturer. He took up his teaching work with enthusiasm and dedication.

In August 1966, he married Rajyalakshmi, who hailed from Vijayawada in Andhra Pradesh. Their first son, Eswar, was born in 1967, and the second son, Sudhakar, in 1968.

He conducted his doctoral research during this time and completed all the requirements for the degree well within the stipulated time. In September or October 1968, he spent a month at IIT-Kanpur to perform the computer work needed for his thesis. He received the Ph.D. degree from IIT-Madras in August 1969. Professor R. G. Narayana Murthi was the adviser. The title of his PhD thesis was “Synthesis of Plane Lower Pair Mechanisms for Bivariate Function Generation”. Professor F. Freudenstein, who is considered as the father of modern kinematics, was one of the thesis examiners. Freudenstein had noted that the subject matter, expression, and language used in the thesis were all at such a high level that the work was eligible for being awarded a doctorate anywhere in the world.

He spent nearly two years from late 1969 on a DAAD (German Academic Exchange Service) scholarship at Braunschweig in the erstwhile West Germany. His family joined him for some part of this stay. He was promoted to Assistant Professor in 1970 while he was still in Germany.

As his sons were growing up, he stimulated their interest in mathematics and mechanics. He devised novel methods of speed arithmetic, trigonometry proofs, and intuitive explanations of calculus concepts. Over the years, there were many more such results of creative thinking on his part.

He visited at Braunschweig again in the academic year 1976-77, this time on an Alexander von Humboldt Foundation scholarship. He did his celebrated work on form closure in mechanisms during this time. His paper entitled “Mechanics of Form Closure” (ASME Paper 78-DET-32, 1978) has become a classic cited a few hundred times with a most recent citation in 2011. In August 1980, he was promoted to Professor.

He and his students conducted research in the area of mechanisms at the Machine Elements laboratory in IIT, Madras. He taught many courses at the B.Tech, M.Tech, and Ph.D. levels. Students revered his courses. Students found his courses tough because his standards of teaching were very high. Those who learnt kinematics from him were empowered with the correct way of thinking about the subject. His judiciously mixed intuition and rigour in his teaching. Much of the material he taught in his “Mechanisms and Transmissions” course at IIT-Madras cannot be found in most modern texts. His derivations were insightful. Such basic concepts as Kutzbach-Grübler’s formula and Grashof criterion became profound because of the manner he taught them. His treatment of epicyclic gear trains and their input output torque relation considering friction, synthesis of Geneva wheel-based indexing device, and star wheels were original.

His approach to synthesis of mechanism was unparalleled. He combined his deep understanding of geometry with keen analytical skills to come up with straightforward synthesis procedures. One example is the synthesis of cam-operated mechanisms in which a cam is the output member and the roller-crank is the driving member. He devised ingenious methods in which the limits of transmission angle can be discerned while satisfying arbitrary motion specifications including indexing, multiple swells and reversal of motion.

His laboratory in IIT, Madras had a precious collection of mechanism models. He encouraged his students to build models. Those who worked with him know that he had thorough understanding of practical aspects of making prototypes and their implications in eventual manufacturing. His interests were not confined to kinematics. He was interested in machine design as a whole. He translated Niemann's book on Machine Elements Design into English, along with some of his colleagues.

His inspiring research career ended abruptly while he was still in service. He passed away on April 13, 1997 in Madras after a massive heart attack. His wife, K. Rajyalakshmi, continues to reside in Madras, in an area called Velachery, adjacent to the IIT campus. The older son, Dr. Kalluri Eswar, is a Software Engineer at Google, in Mountain View, California. The younger son, Dr. Sudhakar Kalluri, is a Principal Member of Technical Staff at Ikanos Communications, in Fremont, California.

G. K. Ananthasuresh
Indian Institute of Science, Bangalore

11th National Conference on

Industrial Problems on Machines and Mechanisms

(IPRoMM-2014)

February 26—27, 2014

Organized by

Mechanical Engineering Department

I.T.S Engineering College, Greater Noida (UP)

Under the aegis of

Association for Machines and Mechanisms

REPORT

The conference on Industrial Problems on Machines and Mechanisms IPRoMM 2014 is one of the series of national events organized biannually under the aegis of Association for Machines and Mechanisms (AMM), an affiliate of the International Federation for Promotion of Mechanism and Machine Science (IFToMM), on different themes of interest of industrial problems on machines and mechanisms. Realizing the vicinity of I.T.S Engineering College, Greater Noida to automobile and allied industries in Northern India, Agricultural Machines and human orthopedic support system, the theme of this conference was chosen accordingly, i.e, "**CAD Simulations in Automobile and Allied Industry**." The aspect of Computer Aided Design (CAD) simulations was chosen as it is an almost indispensable component in today's design and analysis of almost any system, particularly, in automobile designs, vehicle and crash simulations, safe vehicle designs, driver simulators, etc.

The 11th National Conference on "Industrial Problems on Machines and Mechanisms", IPRoMM-2014 organized by the Mechanical Engineering Department, I.T.S Engineering College, Greater Noida under the aegis of Association for Machines and Mechanisms (AMM) was inaugurated on 26th of February, 2014. The inaugural session was attended by Conference Chair and Director, I.T.S Engg. College, Dr. Vineet Kansal, Conference Convener Prof. S. S. Chauhan, Co-Convener Prof. Sanjay Yadav, Chief Guest , Mr. Dinesh Tyagi, Director, International Centre for Automotive Technology, Manesar, Gurgaon, Chief Administrator of I.T.S the Education Group, Mr. S. Sood, invited guests of honour, Prof. S. K. Saha from IIT Delhi, Prof. B. Sahay from IIT Patna and other invited dignitaries and delegates from reputed industrial and academic organizations and faculty and students of the college. After lamp lighting, the audience was welcomed by Prof. S. S. Chauhan and Prof. Sanjay Yadav presented the theme of the conference.

Thereafter, the invited guests presented short speeches describing the importance of having conferences and interactions with the industry. Conference proceedings were released by the dignitaries in the inaugural session. The inaugural session was followed by the plenary session where invited talks were presented by the persons from industry and academia. First session saw lectures by Mr. Chaman Singh Dy. Manager-Product development from New Holland Fiat (India) Pvt. Ltd., Greater Noida giving a brief introduction to the company and describing different range of products being manufactured at the company premises. It was followed by second invited talk by Prof. R. A. Khan from Galgotia's University. His lecture discussed the use of Computer Aided Engineering in automotive industry and how the use of new softwares changed the design capabilities of the engineers from the era of 60s till today.

Second plenary session was held after lunch time where Mr. Manish Gupta delivered his talk describing his vast experience while working as a Sr. Consultant in Larsen & Turbo (L&T) Faridabad. He described the different approaches of working amongst the people in Korea, Japan and US and compared them with the one in India. He also emphasized on working passionately for the country and to do something new rather than working for money alone and reaching nowhere. This was followed by talks of Air Comdr. S.S. Saxena, Auto-Wings, Greater Noida. He shared his experience while serving in the capacity in Indian Air Force and held the view that fighter jet aircraft is one of the best examples of engineering excellence in design where a non-engineering graduate is flying it and bringing it back safely. He also discussed some of the problems that can be visualized in automobiles from the general point of view and suggested some modifications if they can be incorporated in the designs. The second plenary session ended with the third invited talk by Mr. Naresh Bhagat from Lelogix Design Solutions Ltd, Greater Noida. He introduced the organization in brief and discussed the designing methodologies as taught using various software packages available.

Research Paper Presentation Session was followed by oral presentation that was held in two different halls: Seminar Hall 1 on the ground floor and Seminar Hall 2 on first floor. In this, various researchers from Industry and academia were invited to present their research work in the designing of machines and mechanisms based on the theme of the conference. The papers presented were selected by rigorous reviews from experts in academia and modifications as suggested by them.

Figure 1 Release of conference proceeding

Figure 2 Group Photo after the conference

Second day of the conference started with the workshop on software ReCur Dyn being organized by Mr. B. Sridhar, Director, Function Dynamics (I) Pvt. Ltd., Dwarka, New Delhi. He discussed three case studies involving the mixture of two different particles and their analysis using the related software. The workshop included the description and analysis of problems using software and presented in video forms to the audience to help them understand the involved principles. This was followed by the 3rd plenary session in which invited lecture was arranged by calling experts from industry and academia. Invited lecture presented by Dr. Atul Thakur from IIT Patna comprised of demonstration of robots and advancements in the area using video modes. He skillfully demonstrated different robots being designed by him and his research associates to different realms of life. Prof. S.K. Saha from IIT Delhi also demonstrated the use of software Roboanalyzer and Mechanlyzer in the designing of robots and its links. After the successful completion of the invited lectures and research paper presentations by various researchers from different academic organizations and Industry, the conference was closed by the valedictory function and the national anthem with a grand success.

Dr. S.S. Chauhan
I.T.S Engineering College, Greater Noida, UP

Conference on Microactuators and Micromechanisms

MAMM-2014

Timişoara, Romania, October 2 - 4, 2014

Organized by
University Politehnica Timisoara
Department of Mechatronics

Under the Patronage of IFTOMM
International Federation for the Promotion of Mechanism and Machine Science
Technical Committee Micromachines
Technical Committee Linkages and Mechanical Controls

Conference Chairman
Erwin-Christian Lovasz (Romania)

Conference Co-Chairmen
G.K. Ananthasuresh (India)
Burkhard Corves (Germany)

International Scientific Committee
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Anupam Saxena (India)
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With the support of the Romania IFToMM National Committee - ARoTMM
Ion Vişa
Vistrian Măties
Erwin-Christian Lovasz
Cătălin Alexandru

Aim
The aim of the conference is to bring together researchers, scientists, industry experts and students to provide, in a collegial and stimulating environment, the opportunity for know-how exchange and build up of collaboration in various disciplines referring to micro systems technology.
MAMM-2014 is the first event of this kind at the University Politehnica Timisoara.

Topics
Microactuators
Micro sensors involving movable solids
Micro-opto-mechanical device
Mechanical tools for cell and tissue studies
Micromanipulation and micro-stages
Micro-assembly
Micro-scale flight and swimming
Micro-robotics and surgical tools
Micron-scale power generation
Miniature manufacturing machines

Submission, presentation and publication
Authors are invited to submit a full paper to e-mail address: mamm-2014@mec.upt.ro. The official language of the workshop is English. Overhead projectors and beamers for personal computers will be available. Each paper will be reviewed and the papers reviewed by the Scientific Committee will be published in a book edited by Springer in MMS Series.

Deadlines
Full paper submission: February 28, 2014
Acceptance notification: April 15, 2014
Final paper submission: June 15, 2014

Registration
The registration fee includes the complete program of the conference MAMM 2014 and paper publication. The registration fees are:
Early Registration/IFToMM Members: 300 Euro
Registration after April 30, 2011: 400 Euro
Students/Accompanying Person: 200 Euro
Registered participants will receive a copy of the workshop book.

Venue
The conference will be held in Timişoara at the University Politehnica. Timişoara is a city with long European tradition. It is the first city in Europe with electrically night illumination (1884). Timisoara is located in SW Romania (region Banat) and because there are many gardens in the city, it is known as the city of flowers. It is easily accessible from all countries by plane, train or car.

Accomodation
Timişoara provides accommodation in several hotels of different categories. Early reservation is recommended by contacting directly the Organising Committee. A list of hotels will be soon available on the site of the conference.

Further Information
This is the first call for papers intended to inform about the aim, topics and important dates of the conference. Detailed information on venue, accommodation, social program and other issues will be posted on the conference website.

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Secretariat
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