



INDIAN INSTITUTE OF TECHNOLOGY INDORE

Minutes of the nineteenth (19th) meeting of the Board of Governors (BoG) of Indian Institute of Technology Indore held at 2.30 p.m. on Tuesday, December 8, 2015 at Board Room – Piramal Tower, Mumbai 400 013

Following members of Board of Governors were present:

1	Mr. Ajay Piramal	Chairman
2	Dr. Pradeep Mathur	Member
3	Mr. Sanjay Singh	Member
4	Dr. William Selvamurthy	Member
5	Mr. Aman Kumar Singh (Attended through Video Conferencing from Raipur)	Member
6	Dr. Abhinav Kranti	Member
7	Dr. Siddharth S. Malu	Member
8	CMA Dr. A. R. Subramanian	Secretary

The following were granted leave of absence due to their pre-occupation:

1	Mr. Prakash V. Deshmukh	Member
2	Mr. Ashok Jaipuria	Member
3	Mr. Som Mittal	Member
4	Dr. Suman Mukopadhyay	Special Invitee

The following attended as Special Invitees during the course of meeting for specific agenda items, enlisted therein:

1. Dr. I. A. Palani, Head, Material Science and Engineering - for item no. 19.5.1 (Faculty Presentation).
2. Dr. Somaditya Sen, Associate Dean Planning-II - for item no. 19.7 (Building and Works Matters).
3. Dr. Pritee Sharma, Dean of Administration –for item no. 19.6.2 (for presenting the draft of First Statutes).



PART - I

Item 19.1: Welcome and opening remarks by the Chairman, Board of Governors.

Chairman initiated the discussions with his opening welcome remarks.

Item 19.2: To confirm minutes of the eighteenth (18th) meeting of Board of Governors held on August 24, 2015.

As there were no comments, the minutes of eighteenth (18th) meeting of BoG were confirmed.

Item 19.3: To consider and take note of the Action Taken Report (ATR) on the Minutes of the Previous Meetings.

The Board took note of the Action Taken Report against the previous decisions taken.

Item 19.4: Report of the Director, IIT Indore.

The Report of the Director presented before the Board were taken on record along with other information presented forming part of the Agenda and were taken as read.

The Director has highlighted a few important developments in the Institute as presented in the Report forming part of the Agenda.

In particular he expressed his gratitude to the Board for supporting the institute's endeavor to excel, as recently observed in the case of one faculty member, Dr. Shaikh Mobin, being listed amongst the top prolific authors (Current Science., 2015, 109, 869.)

Item 19.5: Academic and Research Activities

19.5.1: Presentation by Dr. I. A. Palani, regarding the progress/advancement in the relevant area / field of his research.

Dr. I. A. Palani, Head of Material Science & Engineering made a presentation about the activities and profiles of the Department. He further presented to the

members his own significant research areas and results thereto. A copy of the presentation made is placed at **Appendix 19.1** for record.

Members took keen interest and appreciated the excellent work presented.

19.5.2: To consider the proposal for tenure track appointment of Assistant Professor.

The Board took note of the proposal of the Council for introducing the tenure track appointment of Assistant Professors at the entry level to monitor their consistent performance, strength in conducting sustained research in the area of their interest etc.

Director's suggestion to examine this very important issue, in detail, by constituting a committee of experts was accepted.

19.5.3: To adopt a uniform policy regarding vacation leave and casual leave to M. Tech. and Ph.D. students, as decided in the Council of IITs.

The Board adopted the uniform leave policy as recommended by the Directors of IITs for the PG students and Ph.D. scholars.

19.5.4: To take note of the views of IITs Council regarding the funding of IITs.

The Board considered the proposal already approved in-principle for the Revised Funding system by the Council of IITs which was aimed at reducing the dependency of the IITs on the Government for the day to day functioning in terms of operational expenditure. The operational expenditure would be expected to be met through the students fees and other internal income. The Government would be supporting the Capital expenditure including research related support and the students would be extended the loan assistance through external financial institutions.

While taking note of the proposal approved in-principle by the Council, it was decided that the outcome of the Report of the sub-committee constituted by the Council may be awaited for further modalities and all the IITs will be regulated by the decision of the Council.

Item 19.6: Finance & Administration Matters:

19.6.1: To consider and approve the Budget Estimates (BE) for 2016-17 along with the Revised Estimates (RE) for 2015-16.

The Board deliberated on the proposed Budget Estimates (BE) for the financial year 2016 -17 along with the Revised Estimates for 2015-16.

The BE for 2016-17, along with the RE for 2015-16, duly recommended by the Finance Committee, was approved.

19.6.2: Presentation of draft of the *First Statutes* of the Institute.

Dr. Pritee Sharma, Dean of Administration, gave a preamble for a need for the institute to have its own Statutes, as required according to the Act. Till such time that the new IITs formulate their own Statutes, they operate under the Statutes of the mentoring institutes.

Dr. Sharma presented the procedures followed in the preparation of the draft Statutes: an institute led committee chaired by Dean of Administration, and its members being from faculty and administration staff, followed by discussion with all Heads of Schools / Disciplines/ Centres, who had invited comments from all faculty members on the draft circulated to them. A detailed study of existing Statutes of other institutes and some additions and deviations from them were presented.

The Board appreciated the work done and made some suggestions. It accepted Director's suggestion that now, a high level committee of external experts examine the draft Statutes, with one of the experts being a Board Member, before placing it before the Board (by circulation) for approval.

19.6.3: Replacement of existing outdated ambulance and need for provision of an advanced ambulance for the institute.

The Board considered and approved the proposal to acquire a state of the art ambulance with modern life saving equipment for meeting the requirement of the Institute, in view of the locational disadvantage of the permanent campus at Simrol.



Item 19.7: Building & Works Matters:

19.7.1: To take note of the Progress on Campus Development of Permanent Campus at Simrol.

The Board took note of the Campus Development activities of the permanent Campus at Simrol. Presentation made by Dr. Somaditya Sen, Associate Dean Planning-II, was also taken note of.

Following action taken report was also taken note of :

- i) Despite every possible effort to accelerate the pace of progress, it was reported that M/s Mecon Ltd., the PMC is trying to scuttle the initiatives either owing to lack of experience or otherwise.
- ii) In certain cases, the design and the requirement was not studied properly by the PMC leading to not optimising the calculations, etc leading to delays in making recommendation.
- iii) The architects could have made better optimal use of the natural contours for optimising the design in terms of the need for trenching, digging, etc. to follow the natural flow of services such as water, drainage etc. artificially creating the flow against the nature, in parts of the campus could have been avoided.
- iv) The PMC could not properly examine and vet the drawings of the architects as most of them were observed to be over designs beyond the load requirement.
- v) It has been decided to seek the guidance of a contractual expert who will look into the contractual terms in details to suggest the way out for deviations, documentation of such deviation in quantities through analysis, design implications, etc.
- vi) The Board was apprised of less than satisfactory performance by the institute Engineers in implementing the overall campus construction work in terms of timelines and proper supervisions. Director sought support of the Board to investigate lapses on part of institute's engineers for delay, quality management, etc. and for possible action against the concerned. The Board supported the proposal.



19.7.2: To consider nominating new members of Building and Works in place of those whose term is nearing completion.

The Board approved the nomination of the following members for a further term of 3 years w.e.f. January 1, 2016.

1. Dr. Suman Mukhopadhyaya, Member (Dean of Planning in IITI)
2. Professor K.C.S. Rao, External Member - (Director General (Works) (Retd.)).
3. Mr. Biswakesan Sahoo, External Member - (Executive Engineer (Electrical) IIT Bombay).
4. Mr. Aditya Kumar Singhal, External member (Director General (Works), CPWD Ghaziabad (U.P.)

However, in place of Mr. Adarsh Sakuja, the Board approved the nomination of Dr. Rakesh Kumar, the Principal Scientist of Central Road Research Institute, New Delhi for a term of 3 years, w.e.f. January 1, 2016.

19.7.3: To consider the proposal for construction for faculty / staff quarters as recommended by the Building & Works Committee.

The Board considered the recommendations of the Building & Works Committee, and the need for housing for faculty and staff in an integrated residential campus.

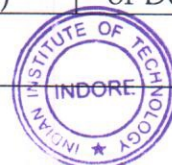
The Board approved the proposal, in-principle, for the proposed housing of faculty and staff for 54 flats (i.e 27 each of 2 BHK and 3 BHKs) at an estimated cost of Rs 31.14 crores. The additional funding required for the construction to be met under Phase I itself, which is well within the DPR norms of the construction area, may be taken up with the MHRD for support.

Item 19.8: Other matters for confirmation / ratification by the BoG:

19.8.1: To ratify appointment of faculty members (under Reserved Category).

The Board ratified the appointment of the following faculty members under the OBC reserved category which was undertaken as part of the special drive.

Sl. No.	Name of the Faculty Member	Discipline	Position offered	Date of Joining if Joined
1.	Dr. Manoj Verma	Mathematics	Assistant Professor (Contractual)	Expected to join end of December, 2015
2.	Dr. Ashok Kumar Moses	Mathematics	Assistant Professor (Contractual)	Expected to join end of December, 2015



19.8.2: To ratify the extension of credit card facility extended to certain official functionaries of the Institute.

The Board considered the proposal and ratified the extension of credit card facility to functionaries of the Institute but the facility would be restricted only to the official expenditure as per the existing delegation of powers without any deviation.

19.8.3: To take on record the decisions of the twelfth (12th) meeting of the Finance Committee held on August 8, 2015.

The Board took note of the decisions and recommendations forming part of the Minutes as a matter of record.

19.8.4: To take on record the decisions of twenty first (21st) and twenty second (22nd) meeting of Building and Works Committee held on July 30, 2015 and September 11, 2015 respectively.

The Board took note of the decisions and recommendations forming part of the Minutes as a matter of record.

19.8.5: To take on record the decisions of the eight (8th) and ninth (9th) meeting of the Senate held on October 31, 2014 and August 5, 2015.

The Board took note of the decisions and recommendations forming part of the Minutes as a matter of record.

Item 19.9: Items for information:

19.9.1: To report latest position of grant-in-aid received and progress of on- going projects by the institute.

The Board took note of the latest position of grant-in-aid and the progress of on-going projects of the Institute.

Part II

Item 19.10: Confidential Matters

Tenure of the present Chairman, Board of Governors, will expire on March 3, 2016. The Board deliberated and prepared a resolution to be sent to MHRD by the Director, as requested for by MHRD. Confidential Resolution is available in office of Chairman.

Item 19.11: Any other item with permission of Chair.

The meeting ended with a vote of thanks to Chairman.



(CMA Dr. Arun Subramanian)
Registrar, IIT Indore



(Professor Pradeep Mathur)
Director, IIT Indore



(Mr. Ajay Piramal)
Chairman, Board of Governors
IIT Indore

Appendix - I

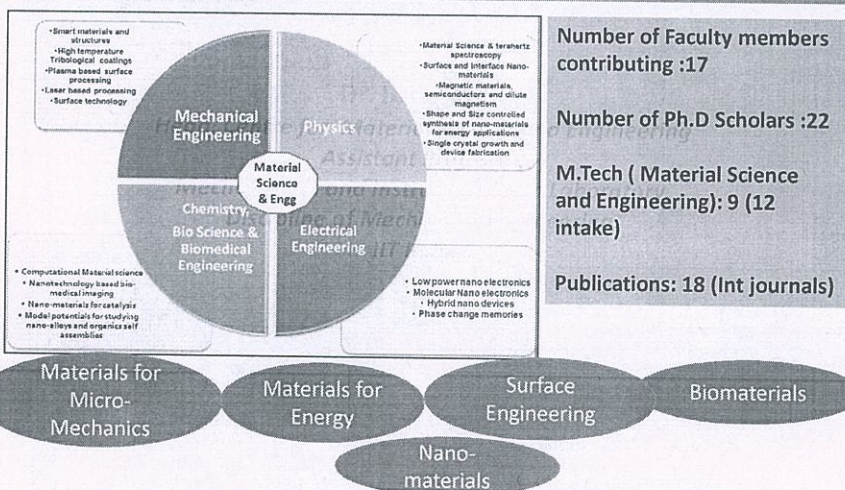
Presentation by Dr. I. A. Palani

Materials for micro mechanics
and functional device development.

Materials for micro-mechanics and functional device development

Dr. I.A. Palani
Head, Centre for Material science and Engineering
Assistant Professor,
Mechatronics and Instrumentation Laboratory,
Discipline of Mechanical Engineering,
IIT Indore

Centre for Material science and Engineering



Centre for Material science and Engineering

Nanomaterials

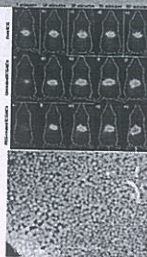
Dr. Pankaj R Sagdeo,
Dr. Rajesh Kumar,
Dr. Preethi Bhohe,
Dr. Krushna Mavani,

Biomaterials

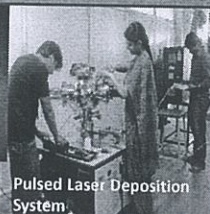
Dr. Rajneesh Mishra,
Dr. Mobin,
Dr. Sathya,
Dr. Shanjay Singh,
Dr. Sharad,
Dr. Bishwarup pathak

Surface Engineering

Dr. S. Kazi
Dr. Sathyajit



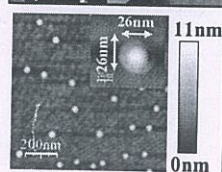
Red Light Emission from Si Nanowires



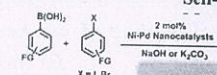
Pulsed Laser Deposition System



Self-assembly of Thymine



Self-Assembled Nano-



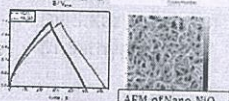
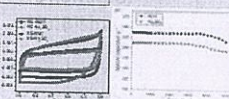
Ni-Pd nanocatalyst with high Ni/Pd ratio (9:1)
High synergistic interactions
Water-based reactions



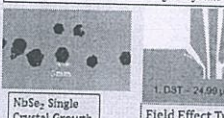
21 examples
Isolated yields 32 - 95 %
Moderate reaction temperature
(rt or 50 deg. C)

Energy

Material for Supercapacitors Applications



Device Fabrications From Single Crystals

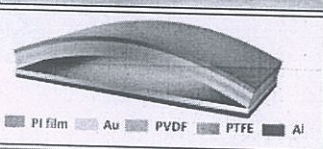
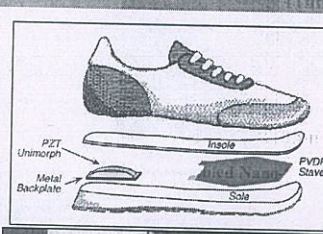


Field Effect Transistor

Transparent nano ZnO on Flexible Substrate



For Solar Cell Applications

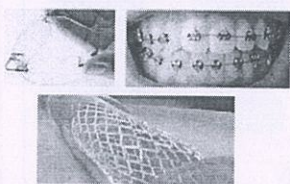
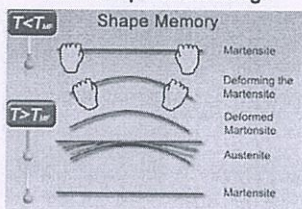


Dr. Shaibhal Mukherjee, Dr. Vipul Singh, Dr. Somaditya sen,
Dr. Anbarasu, Dr. Abhinav Kranti, Dr. I.A. Palani, Dr. Shirage,

Development of Smart materials and Structures

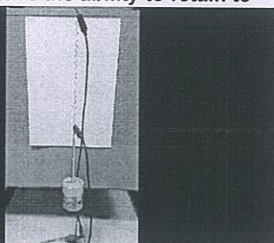
Shape Memory alloys

- Shape memory alloys are the novel materials which have the ability to retain to their shape on heating.

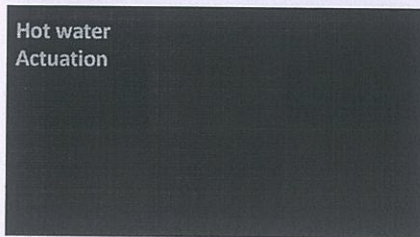


Dynalloy.com

Electrical Actuation



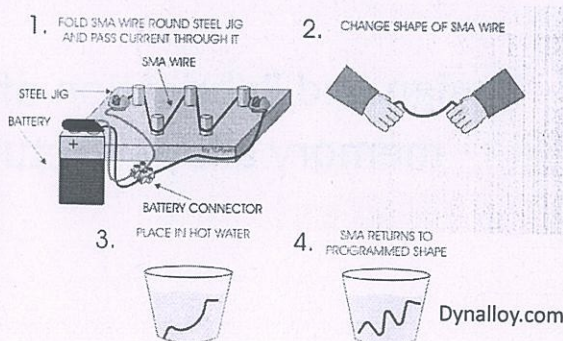
Hot water Actuation



Composition and Training of an SMA actuators

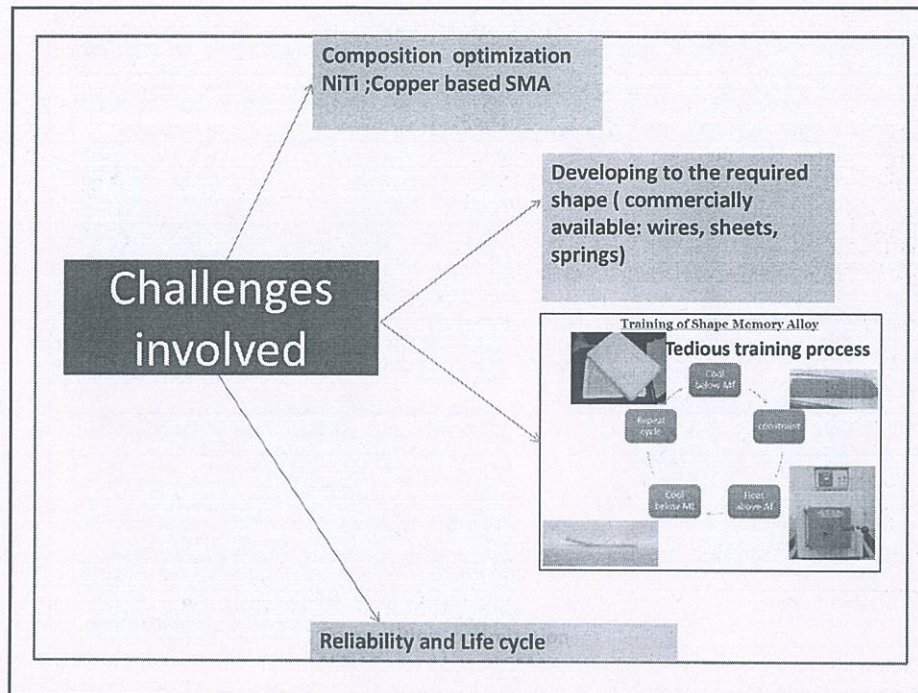
Material Exhibiting Shape memory effect

- > Ni-Ti(Nitinol)
- > Ni-Ti-Cu
- > Cu-Zn-Al
- > Cu-Al-Ni
- > Fe based SMA etc



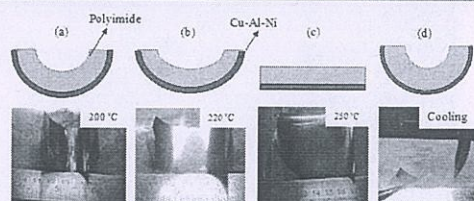
ZS-12-2015

6

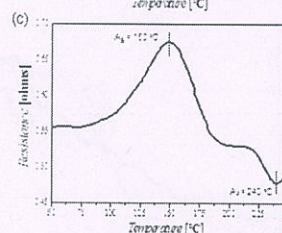
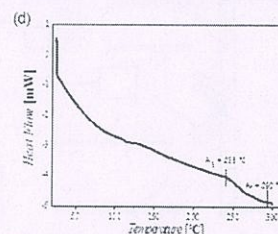
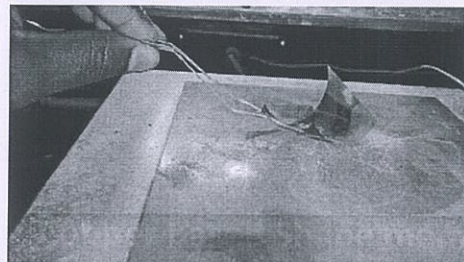


Design and Fabrication of Shape memory alloy structures

Copper based Shape memory alloy bi-morph developed In house

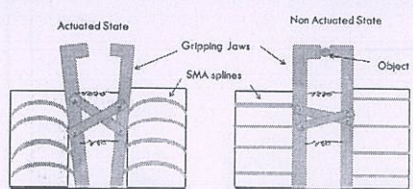


Synthesized using thermal evaporation method



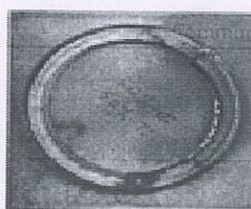
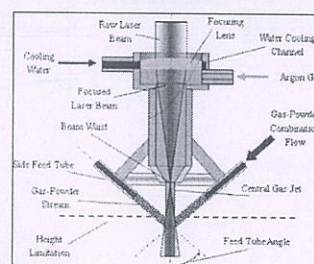
Communicated to Advance Materials

3-D printed NiTi shape memory alloy structures



Gripper off Gripper on

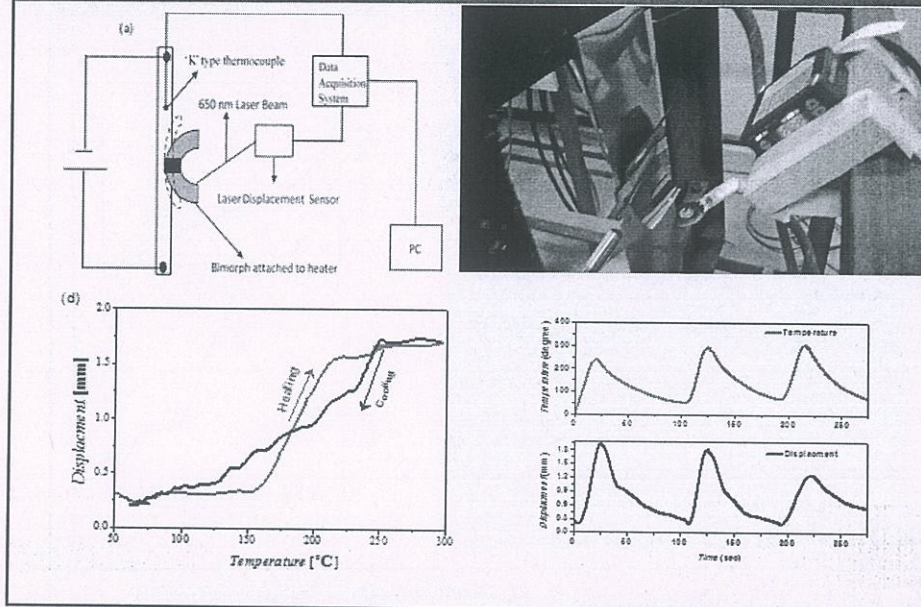
Proposed SMA Spline based Design



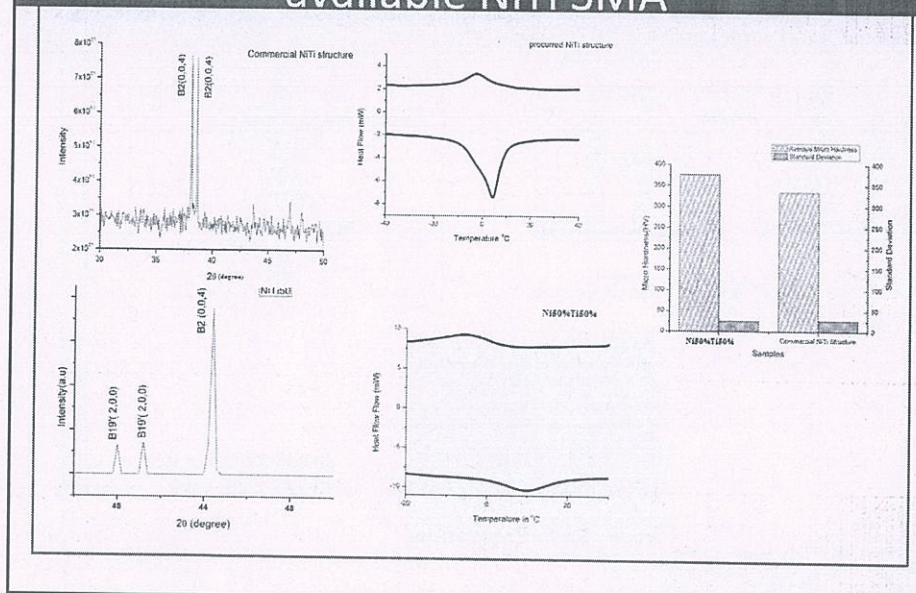
In collaboration with
RRCAT (DAE unit)

Optics and Laser technology, 2015

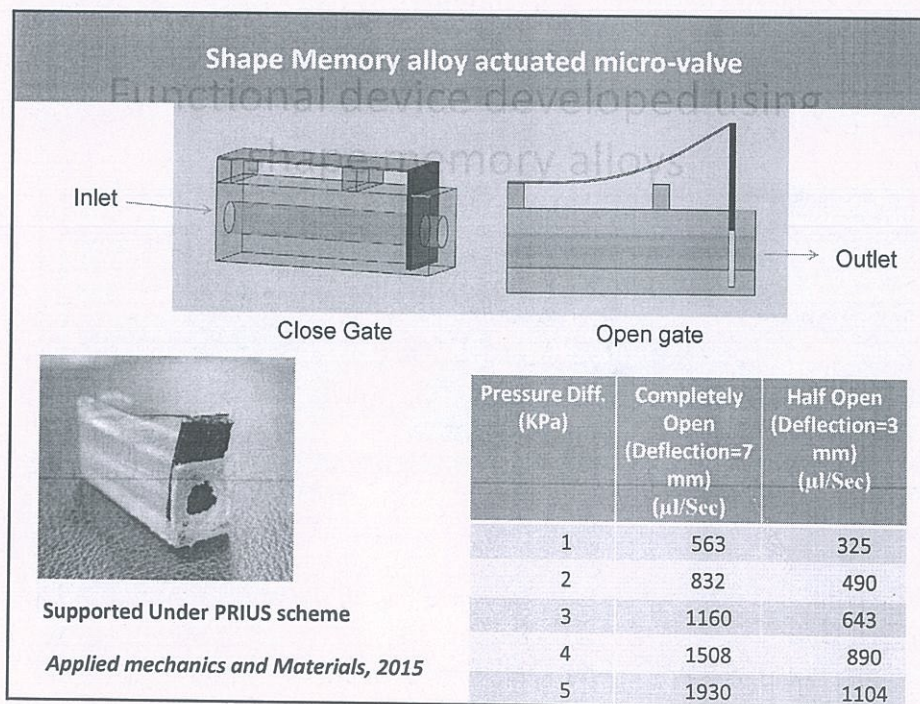
Cu based Shape memory alloy bi-morph for micro-diaphragm

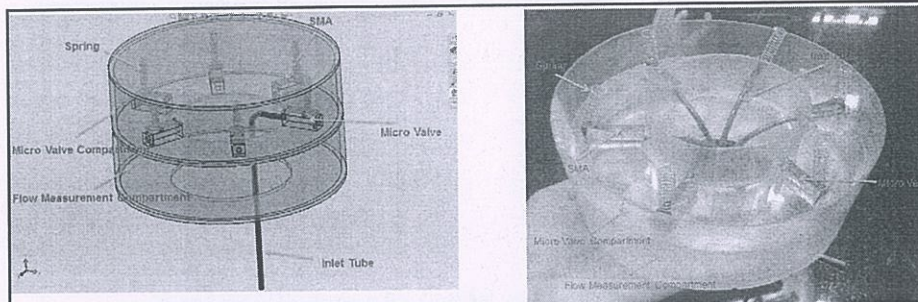


LRM manufacture NiTi SMA Vs commercial available NiTi SMA

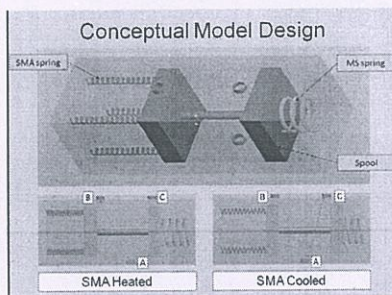


Functional device developed using shape memory alloys

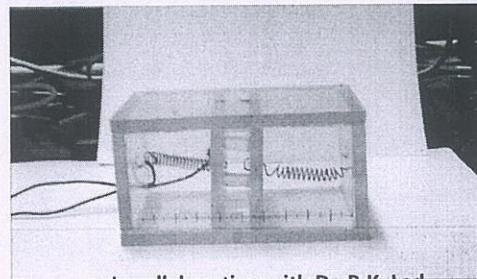




Shape memory actuated directional flow control valve

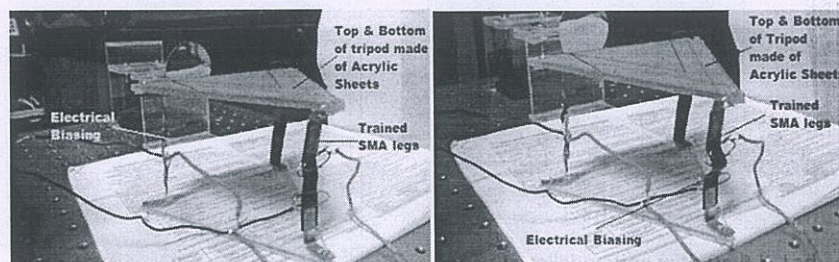


Supported Under PRIUS scheme



In collaboration with Dr. B.K. Lad, Industrial Engineering Lab

Micro-positioning stage for Light eam steering

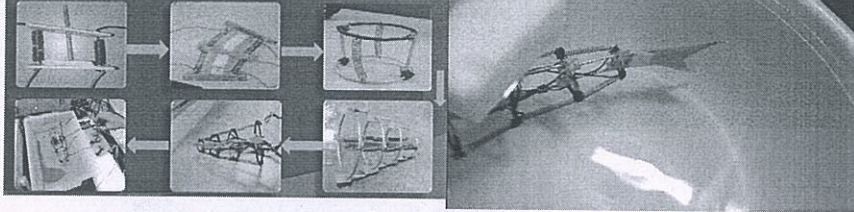


Tripod with SMA as its legs before actuation

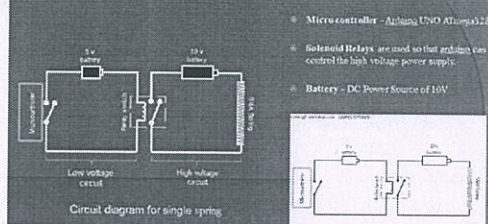
Tripod with SMA as its legs after actuation

Aquatic-robot Developed In-house (SMA fish)

Design process



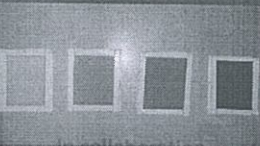
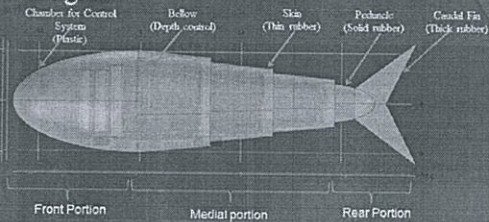
CONTROL SYSTEM



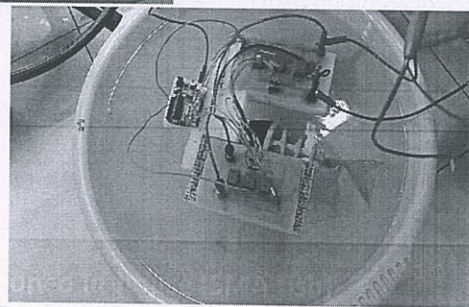
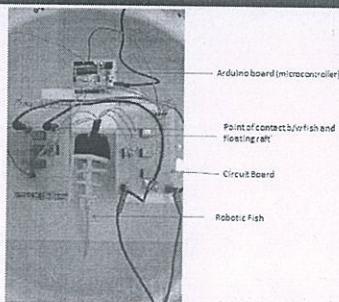
In collaboration
with National
Institute of Ocean
Technology,
(NIOT), Chennai

Aquatic-robot Developed In-house (SMA fish)

Block diagram



Flexible Elastic skin



Adaptive Flapper for missile control

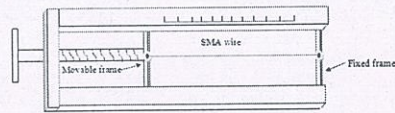
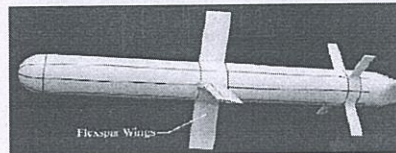
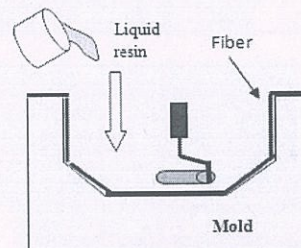
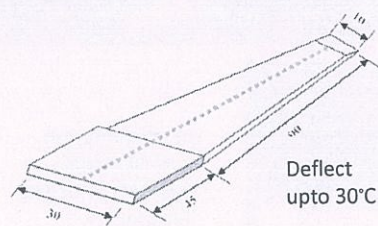


Fig.1 Schematic of pre strain set up for SMA wire

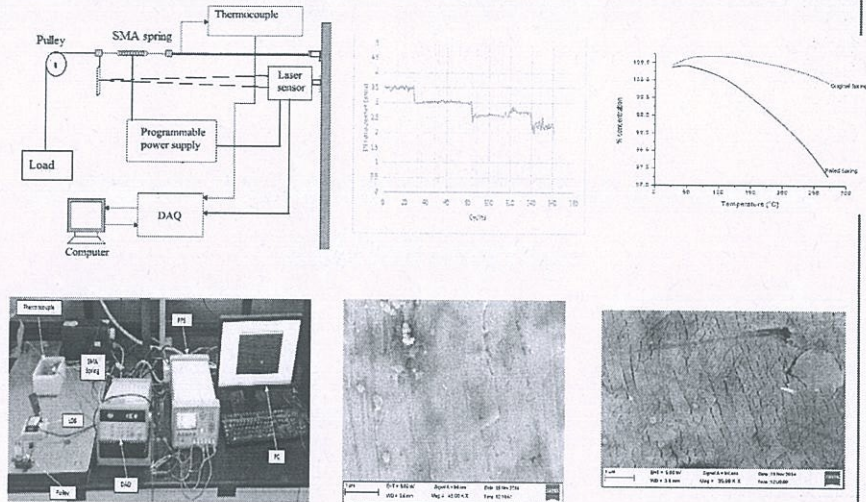


Proposal under discussion with
Research Centre IMRAT, DRDO

Reliability and life cycle analysis

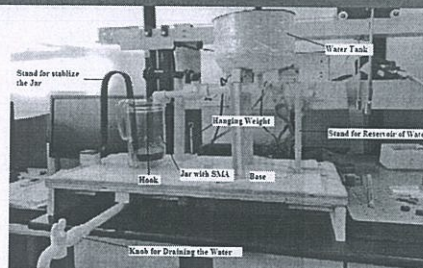
*In collaboration with Industrial Engineering Lab, Mechanical Engineering
Department*

Reliability and life cycle analysis



In collaboration with Dr.B.K.Lad

Reliability and life cycle analysis



Hot water actuation

Laser actuation

Patent application submitted

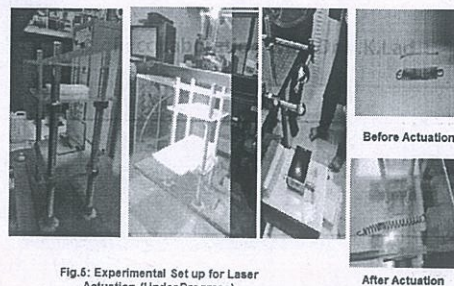
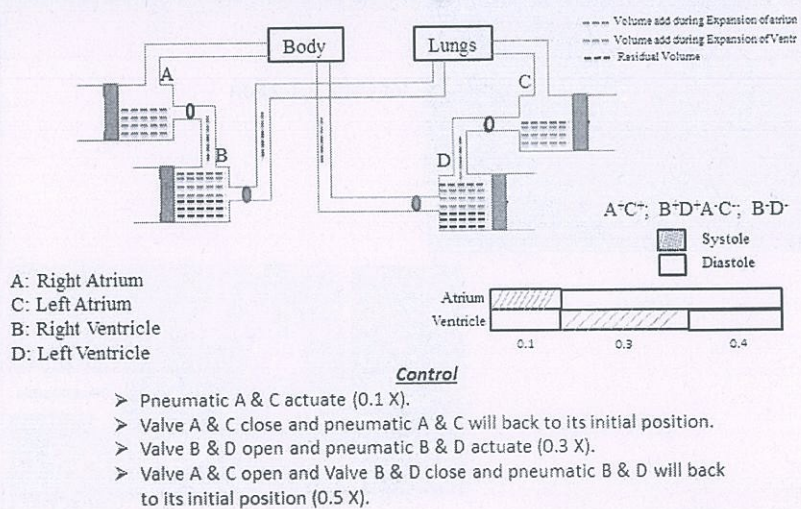


Fig.6: Experimental Set up for Laser Actuation (Under Progress)

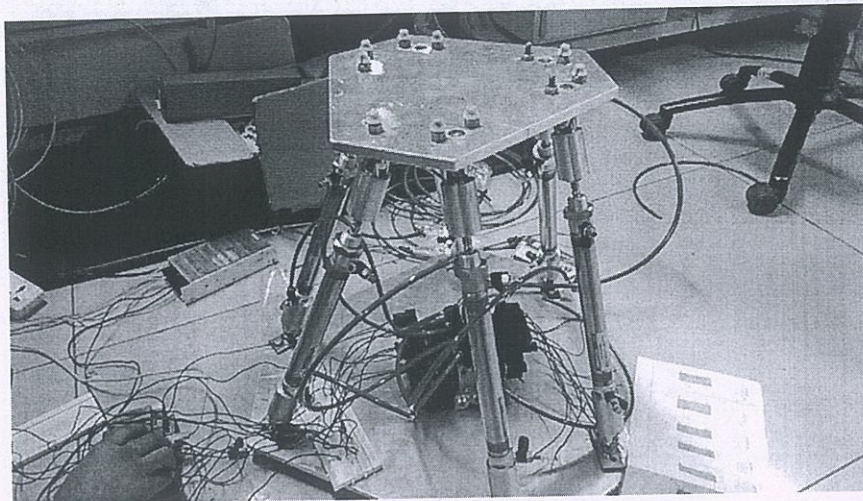
In collaboration with Dr.B.K.Lad

Research initiatives on Mechatronics system Design

Design and Development of Heart simulator



In collaboration with Dr.B.K.Lad



Summary and Scope of future work

Achievements

- ✓ The copper based shape memory alloy bi-morph has been demonstrated for the first time
- ✓ Deflection of around 2 cm has been achieved by shape memory alloy bi-morph
- ✓ Laser additive manufacturing of Shape memory alloy has been demonstrated for the first time
- ✓ Setup to investigate the life behaviour with water and laser assisted actuation has been developed for the first time

Future work

- Towards the development of shape memory alloy actuated engine
- Towards the development of automatic sunlight tracking for flexible PV cell

External funding details

DST(TDD):DST:JSPS(Kyushu University):DST:EPSRC (Cranfield university):
Wabco India(Consultancy)=1 crore , 21 lakhs(sanctioned)
DST& DRDO (submitted): 75 lakhs

Total number of Phd Student: 3
(Mechanical) & 3 (Mate. Science Engg)
M.Tech students involved: 5
B.Tech students involved: 11

14 Research Publication (After joining IIT Indore)
2 Patents (In the final stage of submission)

Thank you