

प्रो. पी. क्रिस्तोफर सेल्विन
कुलसचिव

Prof. P. Christopher Selvin
Registrar




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9. MoUs with Industries

The CIs of HBNI have entered into many MoUs with Industries and has a very robust Industry linkage cell functioning. The following 5 MoUs are attached herewith as prescribed.

1. MoU with M/s Larsen & Toubro Ltd., for collaboration on sharing of know-how and expertise related to Tokamak systems and plasma technologies.
2. MoU with Man Made Textiles Research Association (MANTRA) for the development of plasma textile technology and machinery.
3. MoU with Centre for Cellular and Molecular Platforms, Bangalore for improving, developing and translating different plasma-enabled technologies developed at IPR for applications in life sciences.
4. MoU with Shri Raghavendra Technical Services Pvt. Ltd., Ahmedabad.
5. MoU with M/s Johnson & Johnson Limited, Mumbai for Research and Development on an Energy Recovery Processing Plasma Technology.


(Prof. P.C. Selvin)

MEMORANDUM OF UNDERSTANDING

BETWEEN



INSTITUTE FOR PLASMA RESEARCH

Gandhinagar - 382428 (Gujarat)

AND



LARSEN & TOUBRO LIMITED

Mumbai, Maharashtra

FOR

**Collaboration on sharing of knowhow and expertise
related to Tokamak systems and plasma technologies**

APRIL 2022



महाराष्ट्र MAHARASHTRA

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BL 773655



PREAMBLE :

श्रीम. एल. व्हा. सांगळे

This first day of April in the year Two Thousand and Twenty Two, a Memorandum of Understanding (hereinafter referred to as 'MOU') is entered into by and between the Institute for Plasma Research, (A Grant-in-Aid Institute of Department of Atomic Energy, Govt. of India), having its registered office at Bhat, Near Indira Bridge, Gandhinagar - 382428 (Gujarat) (hereinafter referred to as "IPR" which expression shall, where the context so admits, include its successors and permitted assigns) on ONE PART;

AND

Larsen & Toubro Limited, a public limited company incorporated under the companies Act 1956, duly organized and existing under the Laws of India, having its registered office at L&T House, Narottam Morarji Marg, Ballard Estate, Mumbai - 400 001, India (hereinafter referred

L. & T.

House, Narottam Morarji Marg, Ballard Estate, Mumbai - 400 001, India (hereinafter referred to as "L&T" which expression shall, where the context so admits, include its successors and permitted assigns), on the OTHER PART; on the terms and conditions hereafter contained in this MOU.

AND WHEREAS, this MoU is a task specific MoU executed by and between the Institute for Plasma Research (IPR) and L&T for the purpose of collaboration as specified in Article 1 of this MoU. Hereinafter both IPR and L&T will be collectively referred to as 'PARTIES' and individually referred to as PARTY;

WHEREAS IPR is a research institute under the Department of Atomic Energy, Government of India and is engaged in R&D activities in magnetically confined fusion plasma tokamak devices, fundamental studies and developments related to plasma science and technology, computational simulation and analysis, experimental testing/simulation facilities, design and development of fusion technologies such as first wall and divertor assembly, super conducting cables and magnets development, high power RF systems, beam technologies, high heat flux materials and systems etc. IPR has developed and routinely operates two tokamaks viz. ADITYA-U and SST-1, and has the relevant expertise related to the same. IPR is also directly contributing to ITER Organization (IO), Cadarache, France (hereinafter referred to as 'IO') through ITER-India, India's domestic agency (IN-DA) and also has undertaken service contracts with IO directly. IPR also works on developing societally relevant plasma technologies such as in areas of waste management & disposal, medical and bio-medical applications, artificial intelligence and deep learning for diagnosis of chest anomalies from chest x-rays, energy and power generation from waste using plasma technologies, surface engineering systems and technologies etc.

WHEREAS L&T is one of India's largest engineering companies, with its Heavy Engineering division contributing to Nuclear Industry contracts on a large scale (hereinafter also referred as "L&T HED"). L&T HED is inter alia engaged in the business of manufacturing custom designed equipment and systems for supplies across the globe and its capability spectrum covers in-house engineering, R&D centers and world class fabrication facilities. Manufacturing teams of L&T HED are backed by production engineering and manufacturing process development centers and its Product Development and Process Technology Centre

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in Mumbai carries out new product development and R&D for process plant as well as nuclear equipment & systems (including electronic systems/ subsystems) for strategic sectors. As a part of its contribution to nuclear fusion, L&T has already supplied the complete CRYOSTAT assembly and In-wall Shields to IO at Cadarache, France. Currently L&T team is located at ITER site for the assembly and installation of Cryostat in the Tokamak pit. L&T will also be involved in Vacuum Vessel welding production phase along with ENSA for ITER project. L&T has also supplied 160+ Canisters/Casks (for the spent fuel storage and transportation) to Transnuclear USA, part of Orano, under stringent US NRC regulations.

WHEREAS L&T with its expertise in heavy engineering fabrication, turnkey project execution, wishes to further expand its expertise, following the completion of manufacturing of ITER Cryostat in its heavy engineering division, in other important technical activity areas for fusion devices, that includes major component assemblies of fusion devices, manufacturing activities involving advanced multi axis machining, dis-similar material jointing, Electron Beam Welding, Laser Beam welding,

WHEREAS L&T realizes the need to incorporate a sound understanding of the technical aspects involved in the integration of component and subsystems for fusion devices, the metallurgical aspects of advanced welding process, dissimilar material joining and their special qualification requirements,

And L&T assesses that IPR is the repository, in India, for such expertise, in the field of tokamak systems and devices and that the expertise of IPR on these areas of research and technology would be very useful to L&T.

L&T therefore foresees that a joint effort on collaboration with IPR will strengthen the core expertise in development and testing of various assemblies and components related to tokamaks such as those needed by IO.

WHEREAS L&T hence, approached IPR with a proposal to collaborate on areas of mutual interest and both the PARTIES collectively decided to enter into a Memorandum of Understanding (MoU) for jointly working on areas of mutual interest such as but not limited

A. L&T



to computational simulations & analysis, design & development, fabrication & testing of fusion tokamak systems and/or sub-assemblies like divertor, remote handling, etc.

Whereas, IPR considers it important to adopt an inclusive strategy for the overall technological growth on Indian industries and thereby assess a feasibility to associate with industry on a non-exclusive basis.

Both the PARTIES hereby agree to this MoU as follows:

1.0 OBJECTIVE OF MOU:

The overall objective of this MOU is the collaboration between both the PARTIES on sharing of knowhow related to tokamak systems and plasma technologies; and the same is divided into sub-tasks as listed below:

- a) On Fusion Technologies: Scientific and technological collaboration for all tasks undertaken by L&T related to tokamak systems and associated sub-systems which include but not limited to divertor technologies, vacuum component fabrication, remote handling technologies, hot cell etc. and utilization of IPR's infrastructure such as high heat flux materials development and testing, vacuum brazing, Electron Beam Welding (EBW), Laser welding, qualification process and development of non-destructive testing, computing facilities and simulation expertise, Virtual Reality (VR) facility for immersive design reviews, interface studies, assembly and maintenance simulation & analysis, control of robots using haptic feedback, virtual walkthroughs, and operators training, dissimilar metal joining, vacuum testing equipment, cryogenic testing etc. for proposals related to ITER project.
- b) On societal technologies: Scientific and technological collaboration for various development needs and tasks of L&T such as plasma pyrolysis/gasification systems for power generation, plasma based coal ignition systems for coal based thermal power plants etc. and other such areas as deemed necessary by both the PARTIES.

2.0 METHODOLOGY:

Both IPR and L&T will jointly carryout development and/or testing activities as per the topics mentioned in the objective of this MoU. As need arises, each specific objective shall be

mutually discussed and agreed upon as a separate contract. IPR's services offered under such contracts shall be on chargeable basis as per the standard costing guidelines of IPR or DAE.

3.0 SCOPE OF WORK:

NOW, THEREFORE, in consideration of the mutual promises and agreements contained herein, the Parties hereby agree as under:

1. For any new area of interest or opportunity, both L&T & IPR shall mutually discuss the collaboration scope of each party, deliverables, time-scales, costs involved and other relevant terms and will enter into a specific contract. Such contracts will be on paid basis wherein L&T shall pay relevant charges to IPR as mentioned in the specific contract.
2. L&T may request services of IPR during the preparation of technical part of their offer, for bids to be submitted to IPR.
3. In cases where L&T is bidding for IO contracts, IPR shall provide relevant support in terms of scientific consultation, infrastructure etc. in areas such as divertor and first wall technologies, dissimilar metal joining (EBW, laser etc), high heat flux testing, vacuum brazing, non-destructive testing, diagnostics, cryogenics, remote handling and robotics with augmented reality (AR) and virtual reality (VR), testing and characterization facilities etc. Extent of such support shall be clearly defined in the specific contract to be signed by and between the PARTIES on realization of such tender awards.
4. Specific scope of work and responsible authorities of each PARTY shall be explicitly spelt out on the specific contract agreed upon from time to time.
5. L&T may also seek technical services of IPR in preparing proposals for non-conformity resolution. This may include, assessments based on prior experience of IPR on similar works.
6. L&T may seek technical services of IPR in assessing the outcome of simulations that may have to be carried out in assessing a technical concern.
7. L&T may seek technical services of IPR in generating specifications for installation of special manufacturing facilities at their end. Examples may include facilities for EBW, vacuum brazing, Hot Isostatic Pressing, Clean Room facilities etc.

A. L&T.

4.0 GENERAL TERMS:

The areas of interest as indicated under the scope of this MOU shall be governed by separate individual contract/agreement on case to case basis as mutually entered by and between the PARTIES. The general terms of this MOU are as below:

4.1 VALIDITY:

This MOU shall be valid for a period of 05 (five) years from the date of execution of this MoU. However, if found necessary by the PARTIES, the tenure of this MOU can be extended further upon mutual agreement in writing.

4.2 FINANCIAL COMMITMENT:

- (a) The cost towards all activities listed in IPR's scope of work and the deliverables of any specific contract/agreement entered subsequent to this MoU shall be paid by L&T. IPR shall not have any financial obligation under this MoU.
- (b) L&T shall be responsible to make payments of relevant taxes/duties as statutorily applicable from time-to-time under such specific contract/agreement.

4.3 SECRECY & NON-DISCLOSURE:

- 4.3.1 All information under the MoU shared between the PARTIES shall be treated as "Confidential" and shall be subject to restrictions on disclosure other than for the purpose of this MoU. The Recipient shall take the same degree of care as for its own information of like importance in safeguarding against the disclosure of Confidential Information received from the Discloser. The Recipient agrees not to make any use whatsoever at any time of such Confidential Information for any purpose except for the objectives intended to be achieved through this agreement.
- 4.3.2 Recipient shall promptly notify the Discloser upon discovery of any unauthorized use or disclosure of the Confidential Information received from the Discloser and take reasonable steps to regain the possession of such Confidential Information⁹ and prevent further unauthorized actions or other breach of this Agreement.
- 4.3.3 The Receiving Party may disclose part of the Confidential Information with prior written consent of the Disclosing party to contractors/agents/consultants/employees engaged by the Receiving Party for execution of any relevant work, to the extent

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necessary to enable them to perform their duties, provided that the Receiving Party shall impose on such contractors/ agents/consultants /employees the same secrecy obligations as those stipulated in this Article.

4.3.4 The confidentiality obligations shall survive even after the termination or expiration of this MoU. Confidential information shall not include:

- a) information that is available in public domain;
- b) information already known to the receiving PARTY;
- c) information disclosed to the receiving PARTY by a third party not under obligation of confidentiality;
- d) Information developed by the receiving PARTY independent of the confidential information received under this MOU.

4.3.5 For confidentiality obligations relevant to IO, L&T will ensure to comply with IO norms while taking IPR into confidence. IPR shall be informed by L&T well in advance of any such confidentiality obligations needed to be followed under IO contracts. All such confidentiality terms applicable under IO contracts shall be specifically defined and agreed upon in the specific contract signed between PARTIES.

4.3.6 L&T Shall not provide the technical information provided by IPR to any other third party, without the consent of IPR. Under no circumstances shall any information provided by IPR shall form a part of any supporting documentation of a bid that L&T submits to any public financed projects in India.

4.3.7 All Confidential Information, contained in any material & documentation including all originals, copies, computer data files, word processing files, letters or other computer storage files furnished hereunder, shall be ceased to be used by the receiving party and returned to the disclosing party or destroyed by the receiving party within 7 days of such request being made to it, either during the period of subsistence of the obligations herein contained or after termination of this MoU, as the case may be. Upon request made by disclosing party, receiving party shall provide a certificate of destruction.

L&T.



4.4 PUBLICATION:

Any publication arising out of the specific contract shall be jointly authored by relevant authors from both PARTIES. Either PARTY can impose a delay if any Intellectual Property Right (IP Right) has to be captured, with any delay not exceeding 3 months. Each PARTY shall ensure due authorship is given to contributors from both PARTIES.

4.5 INTELLECTUAL PROPERTY RIGHTS:

- a) "Intellectual Property" means the legal rights relating to inventions, patent applications, patents, copyrights, trademarks, mask works, trade secrets, and any other legally protectable information, including computer software, first made or generated by such investors.
- b) Background Intellectual Property: The "Intellectual Property Rights (IP Rights)" for any background work already done and secured by IPR on any such technologies will stay with IPR. Similarly, any of background IP Rights of L&T will stay with L&T. Nothing in this MoU will change a PARTY's ownership to its IP (background IP) which it brings to the Project or specific contract. Except to the limited extent required to perform a PARTY's obligations under this MoU, neither PARTY receives any right, title, or interest in or to any Research Materials provided to it by the other PARTY or any technology, works or inventions of the other PARTY that are not Research Program Inventions, or any patent, copyright, trade secret or other proprietary rights in any of the foregoing.
- c) Intellectual Property: Any new "Intellectual Property Rights (IP Rights)" generated during the course of the project or specific contract shall be jointly owned by IPR and L&T. This also includes any modifications, improvements, or discoveries relating to projects made jointly by both the PARTIES, which are identified by either of the PARTIES as potentially patentable or copyrightable subject matter, shall be jointly owned by IPR and L&T, and would be subject to rights described in this document. The filing of such patent applications would be done through the DAE patent cell.
- d) Patent Prosecution and Expenses: The expenses for filing, prosecution, defense and maintenance of all new IP Rights under the specific contract shall be jointly borne by IPR and L&T.
- e) IPR will be free to discuss, pursue and exploit the knowhow and Background Intellectual Property held by it with other parties, and nothing herein shall hold IPR

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exploiting its IP Rights with other parties of any violation under law or under the obligations of this MoU.

- f) "Secrecy & Non-Disclosure" Clause (4.3) of the MoU shall survive the termination/expiry of the MoU and the terms of the said clause shall be legally binding on the PARTIES, irrespective of the validity of the MoU.
- g) For any IO relevant contract, the specific conditions of Intellectual Property rights shall be applicable as defined and agreed upon in the specific agreement.

4.6 INDEMNIFICATION:

- 4.6.1 Receiving Party shall hold harmless and indemnify the Disclosing Party and keep it always indemnified for any loss incurred or suffered by the Disclosing Party arising out of a breach by the Receiving Party or its contractors/ agents/ consultants/ employees of their obligations under this agreement.
- 4.6.2 Both PARTIES warrant that the use of new IP or Background IP or other Confidential Information does not infringe third Party's rights or does not cause damage to third Parties.
- 4.6.3 In no event will either party be liable for any special, incidental, indirect or consequential damages, losses or claims of any nature whatsoever either in tort, contract or otherwise including loss of profit, loss of production, loss of opportunity etc. in connection with work or services performed under this MoU.

4.7 TERMINATION

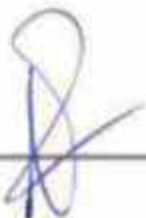
Termination of this agreement shall be applicable on either of the following grounds:

- a) On completion of tenure of this agreement;
- b) On non-realization of project activities or specific contract;
- c) By mutual consent and agreement between the PARTIES;
- d) By breach of the contractual obligations by either PARTY under this MoU.

4.8 NON-EXCLUSIVITY:

This MOU is non-exclusive in nature in such a manner that it does not create a binding on either PARTY, and that either PARTY is free to collaborate with any third party or parties, unless specifically agreed upon in writing under the specific contract.

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4.8 AMMENDMENT OF THIS MOU:

This MOU can be modified or revised only by mutual agreement in writing by the PARTIES. Any new additions to this MOU may be considered as annexure to this MOU.

4.9 TECHNICAL FOCAL POINTS:

The nodal officers acting as point of contact at L&T for co-ordination of this MOU shall be **Mr. Ajaykumar Dubey, DGM & Head- Nuclear Marketing**; Whereas the nodal officer acting as point of contact at IPR shall be **Head- Projects and Technology Transfer Section (PTTS)**.

4.10 REPRESENTATION & WARRANTY

Each of the parties represents and warrants in relation to itself and to the other that (a) It has all requisite power & authority to execute, deliver & perform its obligations under the MoU; (b) it will provide such co-operation as the other party as may be reasonably requested in order to give full effect to the provisions of this MoU; and (c) it will perform its obligations under the MoU in compliance with all applicable laws, rules & regulations including local / municipal laws.

4.11 FORCE MAJEURE

Neither party shall be held responsible for non-fulfilment of their respective obligation under this agreement due to the exigency of one or more of the force majeure events such as but not limited to Acts of God, War, flood, Earthquakes, Strike(s), Lockout(s), Epidemics, Riots, Civil Commotions, etc., provided on occurrence and cessation of such events, the party affected by these shall give a notice in writing to the other party within one month of such occurrence and cessation. If the majeure conditions continue beyond six (6) months, the parties shall then mutually decide about the future course of action.

4.12 SETTLEMENT OF DISPUTES

In the event of any dispute between the Parties, which may arise either during the subsistence of this agreement or afterwards relating to or arising from these presents, either party shall notify the other party in writing of the substance of the dispute and both the sides shall do their utmost with the involvement of the respective Directors to settle these disputes amicably through negotiations within 60 days of receipt of any such dispute. Such differences and disputes on which both sides fail to reach a written agreement by means of negotiations, shall





be resolved by an arbitration by a sole arbitrator. The award of the Arbitrator shall be binding on both the parties finally and conclusively. The arbitration shall be conducted in accordance with and subject to the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modifications or re- enhancements thereof for the time being in force. The seat and venue of such arbitration shall be Mumbai and any proceeding arising from this agreement shall be subject to the exclusive jurisdiction of Courts in Mumbai, to the exclusion of all other courts. This Agreement shall be governed by the substantive laws of India.

IN WITNESS WHEREOF, the parties have caused this MoU to be executed in the English languages in duplicate by the proper officials as of the date hereof.

For and on behalf of IPR



Director
Institute for Plasma Research

Date: 01/04/2022

Place: Gandhinagar

Seal:



Witnessed by:



For and on behalf of I&T



Member -I.&T Executive Committee
Sr. Vice President & Head - HE IC
Larsen & Toubro Limited

Date: 01/04/2022

Place: Mumbai

Seal:



Witnessed by:


DEBHATT



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MEMORANDUM OF UNDERSTANDING

BETWEEN

MAN MADE TEXTILES RESEARCH ASSOCIATION (MANTRA)

AND

INSTITUTE FOR PLASMA RESEARCH (IPR)

FOR

DEVELOPMENT OF PLASMA TEXTILE TECHNOLOGY & MACHINERY

S.1 THE AGREEMENT made and entered into force, on 3rd May 2016 between Man-Made Textiles Research Association having its registered office Near Market Telephone Exchange, Ring Road, Surat-395002 (hereinafter called MANTRA) which expression shall where the context so admits include its successors of the ONE PART

AND

Facilitation Centre for Industrial Plasma Technologies (hereinafter called FCIPT) which is a division of Institute for Plasma Research (hereinafter called IPR) which expression shall



where the context admits include its successors) having its Registered Office at, Bhat, Gandhinagar-382428 of the OTHER PART.

S.2 PREAMBLE

S.2.1 WHEREAS MANTRA is a national level textiles research association, linked to the Ministry of Textiles, Government of India, and recognized as SIRO (Scientific and Industrial Research Organization) by Ministry of Science and Technology, engaged in research and development of textiles in general and man-made textiles in particular.

S.2.2 WHEREAS Facilitation Centre for Industrial Plasma Technologies (FCIPT), which is division of Institute for Plasma Research (IPR), is a premier research Institution and which has developed many plasma based technologies like Plasma Nitriding, plasma enhanced chemical vapour deposition, plasma source ion implantation, Plasma pyrolysis of waste, Atmospheric pressure air plasma for textiles etc. IPR is recognized as SIRO (Scientific and Industrial Research Organization) by Ministry of Science and Technology. IPR is accredited as National Laboratory of DAE.

S.2.3 And whereas the two institutions recognizing the vast untapped potential in the area of research in Plasma Application to Textiles & Machinery, Polymer and with State-of-the-Art infrastructure in both the institutions have agreed to undertake diverse collaborative Research Project on the Plasma Applications in Textiles from time to time during the term of the Agreement with mutual exchange of researchers and access to the resources of each other for development and research. To start with, the first set of projects undertaken is as outlined Annexure I to this Agreement (hereinafter referred to as the ACTIVITY). Subsequent collaborative work will become an annexure to this agreement.

NOW IN CONSIDERATION OF THE MUTUAL COVENANTS HEREINAFTER CONTAINED THE PARTIES AGREE FOLLOWS :

S.3 SCOPE OF THE AGREEMENT

S.3.1 The agreement details the terms and conditions for MANTRA and FCIPT undertaking the ACTIVITY, the financial arrangements, and the rights and obligation of the parties hereto, pertaining to the ACTIVITY.

S.4 FINANCIAL ARRANGEMENT

S.4.1 MANTRA and FCIPT have agreed to mobilize support for the proposed project under this MOU as detailed in MOU.

S.5 RIGHTS AND RESPONSIBILITES OF MANTRA

S.5.1 MANTRA shall undertake the ACTIVITY in accordance with the scope of work detailed in Annexures in the Agreement.

S.5.2 MANTRA shall designate and appoint suitable research personnel to carry out the work comprised in the ACTIVITY.



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- S.5.3 In the event of any of the project Personnel leaving MANTRA during the period of agreement, MANTRA shall designate suitable replacements.
- S.5.4 MANTRA will follow its own procedure to select and designate personnel for the ACTIVITY.
- S.5.5 MANTRA would permit each of the project personnel to visit FCIPT or other places in connection with the ACTIVITY, for project review / consultation / presentation.
- S.5.6 All equipment purchased by MANTRA for carrying out the ACTIVITY for carrying out the ACTIVITY using the funds allotted to the Activity or otherwise shall be governed by the rules and regulations of the funding agencies.
- S.5.7 Fulfilment of all procedural, legal, commercial requirements for undertaking the ACTIVITY and implementing the results of the ACTIVITY shall be the responsibility of the respective beneficiary, as defined vide paragraph 5.10.

S.6.0 RIGHTS AND RESPONSIBILITIES OF FCIPT

- S.6.1 FCIPT shall undertake the ACTIVITY in accordance with the scope of work detailed in Annexure 1 to the Agreement.
- S.6.2 FCIPT shall designate and appoint suitable research personnel to carry out the work comprised in the ACTIVITY.
- S.6.3 In the event of any of the Project Personnel leaving FCIPT during the period of agreement, FCIPT Shall designates suitable replacements.
- S.6.4 FCIPT will follow its own procedure to select and designate personnel for the ACTIVITY.
- S.6.5 FCIPT would permit each of the Project Personnel to visit MANTRA or other places in connection with the ACTIVITY, for project review / consultation / presentation.
- S.6.6 All equipment purchased by FCIPT for carrying out the ACTIVITY using the funds allotted to the Activity shall be governed by the rules and regulations of the funding agencies.
- S.6.8 Fulfilment of all procedural, legal, commercial requirements for undertaking the ACTIVITY and implementing the results of the ACTIVITY shall be the responsibility of the respective beneficiary, as defined vide paragraph 5.10.

S.7 COMPLETION OF THE ACTIVITY

- S.7.1 The ACTIVITY shall be deemed to have been successfully completed on submission of the Final Report prepared by both the parties as agreed in Annexure 1.

S.8 RESULTS OF THE ACTIVITY

- S.8.1 MANTRA & FCIPT will jointly write proposals to funding agencies for funding possible proposals, envisaged at the time of signing this agreement are listed in Annexure 1. MANTRA & FCIPT can identify new areas of collaboration apart from what is mentioned in Annexure 1.



- .2 Any intellectual property / publications arising out of the ACTIVITY, provided both the parties have made significant technical contribution, shall be jointly authored by technical contributors from both the PARTIES. In the event of a dispute, Director IPR and Director-MANTRA will decide on joint ownership of intellectual property.
- .3 Both parties shall ensure that any publication in respect of the ACTIVITY is carried out, where applicable, after any application for Intellectual Property, if any, have been filed. These publications will duly acknowledge that the work has been carried out by MANTRA and FCIPT under the sponsorship of Funding Agency.
- .4 If any persons employed or otherwise working under the scope of the ACTIVITY is registered for a research degree in either of the institutions, he / she may include his or her work under the ACTIVITY as whole or part of his / her thesis or dissertation Provided that thesis or dissertation shall be subject to mutual clearance in the same manner as for manuscripts / as in clause S.8.3.

CONFIDENTIALITY

- .1 During the tenure of the agreement and 5 (five) years thereafter, both MANTRA and FCIPT (including its associates, if any) shall treat as strictly confidential and prevent disclosure thereof, of all the confidential information and confidential data exchanged / generated pertaining to work under this agreement for any purpose other than in accordance with this agreement.
- .2 Both Parties will take all reasonable steps to keep confidential, any confidential subject matter and information or materials, whether technical or commercial, acquired formally or informally by either party from the other and will not use them for any other purpose other than the purposes of the agreement.

INTELLECTUAL PROPERTY RIGHTS

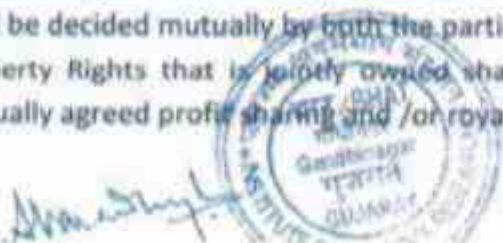
0. The intellectual property rights arising from the ACTIVITY shall be determined as below:

Pre-existing Knowledge and Technologies: Any pre-existing knowledge and technologies of MANTRA prior to the commencement of the ACTIVITY will continue to be the Intellectual Property of MANTRA.

Any pre-existing knowledge and technologies of FCIPT prior to the commencement of this ACTIVITY will continue to be the Intellectual Property of FCIPT.

The Intellectual Property Rights pertaining to the joint development generated as a result of the ACTIVITY that has significant technical contribution from both the parties, shall jointly be owned by both the parties.

Any licensing of the resulting Intellectual Property Rights that is jointly owned by the parties shall be decided mutually by both the parties and the effective earnings from the Intellectual Property Rights that is jointly owned shall be shared equally by both the parties under mutually agreed profit sharing and /or royalty agreements.



S.10.2 Each of the parties to this Agreement agrees to inform in good faith any step taken by it towards obtaining Intellectual Property arising of the ACTIVITY carried out under this Agreement.

S.10.3 MANTRA and FCIPT may use the outcome of research on the developed system for their educational purposes. Also the outcome should be used for the industrial licensing.

S.11 FORCEMAJEURE

S.11.1 Neither FCIPT nor MANTRA shall be held responsible for non-fulfilment of their respective obligations under this Agreement due to the exigency of one or more of the force majeure events, such as but limited to Acts to God, war, flood, earthquake, strike, lockouts, epidemics, riots, civil commotion, etc. provided on the occurrence and cessation of any such events the party affected shall give notice in writing to the other party within one month of such occurrence or cessation. If the force majeure condition continues beyond six months, the parties shall mutually decide about the future course of action.

S.12 EFFECTIVE DATE, DURATION, TERMINATION OF THE AGREEMENT

S.12.1 The Agreement shall be effective from the date of signing and shall remain in force for a period of 60 months (5 years) or such other extended period as mutually agreed to, from the date.

S.12.2 The Agreement shall terminate on the expiry of the period as in clause S.12.1 unless extended by both PARTIES.

S.12.3 During the tenure of agreement, each of the PARTIES hereto can terminate the Agreement either for violation of any the clauses or otherwise by giving a 2 months' notice in writing to the other party. Failure of either party to terminate the Agreement on account of breach or default by the other shall constitute a waiver of that party's right to terminate this Agreement.

S.12.4 In the event of termination of the agreement vide S.12.3 the rights and obligations of the PARTIES thereto shall be settled by mutual discussion; the financial settlement shall take into the consideration the expenditure and efforts undertaken by both the parties.

S.13 NOTICES

S.13.1 All notices and other communications required to be served on FCIPT under the terms of this Agreement shall be considered to be duly served if the same shall been delivered to, left with or posted by registered mail to FCIPT at its address Acting Chief Administrative Officer, Institute for Plasma Research, Bhat, Gandhinagar-382428. Similarly, any notice given to MANTRA shall be considered mail to MANTRA to the Director, MANTRA, Near Telephone Exchange, Ring Road, Surat-395002.



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5.14 ARBITRATION

14.1 Any dispute or difference arising under or in relation to this agreement shall be settled by a Sole Arbitrator to be appointed by the parties in accordance with the provisions of the Arbitration and Conciliation Act, 1996 as amended from time to time.

5.15 JURIDICTION

5.15.1 This Agreement shall be governed by the laws of India and the courts at Gandhinagar shall have the exclusive jurisdiction to entertain, try or decide the dispute arising under this agreement.

SEAL OF PARTIES

IN WITNESS THEREOF THE PARTIES HERETO HAVE SIGNED THIS AGREEMENT ON THE DATE, MONTH AND YEAR MENTIONED HEREUNBEFORE.

Parties

For and on behalf of

Man Made Textiles Research Association

Signature:

Name: Dr. S. K. Basu

Designation: Director, MANTRA

Seal

Witnesses (Name & Address)

For and on behalf of

Institute for Plasma Research

Signature:

Name: A. Varadhraju

Designation: Chairman,

Senior Purchase Committee, IPR

Seal

Witnesses (Name & Address)

Annexure - I

List of possible projects:

1) Design and development of Environment Friendly Plasma System for In-line Treatment of Textile at Moderate Speed.

FCIPT and MANTRA have prepared a collaborative project proposal on plasma treatment of polyester, textile and merino wool to improve the functionality on polyester and textile for wettability improvement and to improve descaling on merino wool for shrink proofing. The line speed of the treatment on 2.5 meter wide polyethylene sheet would be 20 to 40 meter per minute as details given in annexure-II about the sanctioned order by DST, New Delhi. MANTRA is contributing in kind for development of this work. The system will be installed and commissioned at MANTRA.

2) Production of Nano Titania Powder and integration in synthetic textiles for self-cleaning properties as well as for giving a dull finish to polyester.

3) Plasma Nitriding for surface hardening of textile Machinery Components.

4) Plasma pyrolysis for disposal of textile waste material.



Annexure-II

1. **Project Title:** Design and Development of Environment Friendly Plasma System for In-line Treatment of Textile at Moderate Speed.

2. **P. I. Name and Address:** Mr. Vishal Jain
 Institute for Plasma Research
 FCIPT, A-10/B, GIDC, Sector 25,
 Gandhinagar - 382 044, (Gujarat)
 Ph: 079-23269019
 Fax: 079-23269025
 Email: vishal@ipr.res.in

3. **Co-Investigator :**

1. Dr. S. K. Nema
 Institute for Plasma Research
 FCIPT, A-10/B, GIDC, Sector 25,
 Gandhinagar - 382 044, (Gujarat)
 Ph: 079-23269025
 Fax: 079-23269001
 Email: nema@ipr.res.in

2. Prof. P. B. Jhala
 Research Advisor, ICNF (Innovation Centre for
 Natural Fibre), NID (National Institute of
 Design), PG Campus, Gandhinagar,
 Email: pjbhala@nid.edu
 Ex. Advisor (FCIPT, Institute for Plasma
 Research)
 Bhat, Gandhinagar

4. **Name of Collaborative/End User Agencies:**

MANTRA, Surat.

5. **Duration of the Project :** 36 months (Thirty Six Months)

6. **Budget Summary:**
 (all amount are in Rs. Lacs)

S. No.	Particulars	DST, New Delhi Contribution	MANTRA contribution	Total
1	Manpower	8.64	--	8.64
2	Consumables	5.0	--	5.0
3	Equipment	70.0	20.0	90.0
3	Travel	1.5	--	1.5
4	Contingency	1.5	--	1.5
5	Other cost (Misc)	4.0	--	4.0
6	Overhead	5.0	--	5.0
	Total	95.64	20.0	115.64

7. **Objective :**

The objective in this proposal is to design and develop a plasma system for fast (Approximately 40 meters/min) & uniform treatment of 1 meter wide textile to improve surface properties such as wettability, surface friction & shrink proofing in case of the wool &

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functionality and surface finish in case of the fabric which is a basic requirement in the textile industries.

The Plasma system would comprise of medium frequency power supply with suitable advanced control techniques and a plasma processing chamber with electrodes along with dielectric layer to form dielectric barrier discharge and automated conveyor mechanism for in-line treatment of textile at moderate speed.

The project objectives are summarized as below:

- 1) Development of a plasma system which generates uniform plasma of sufficient power density to treat the one meter wide textile (cotton/polyester fabric, Merino wool etc) at a moderate speed of around 20 - 40 meter per minute.
- 2) Designing of an automated power supply with close loop control to ensure the uniform plasma in the gap between the electrodes with dielectric barriers.
- 3) Testing of the wool for Shrink proofing, Friction and Testing of other textile for example cotton, polyester for improvement in functionality.

Process description:

Atmospheric pressure plasma provides active species depending upon the gaseous environment which treat with the surface of the textile in order to enhance various surface properties for example wettability, shrink proofing, hydrophobic, hydrophilic, flame retardant etc without changing the bulk properties of the textile. Hence, plasma process is very useful for in-line process treatment of textile. The most important feature of the plasma technology is that it is completely environment friendly technology and hence, it does not pollute the environment. In this proposal, the uniform plasma will be generated between two electrodes of one square meter area with a gap of nearly 2-5 mm. Plasma species react with the textile surface in order to modify the surface functionality of the textile for example wettability, surface energy etc without changing the bulk properties. The treatment time basically depends on the power density of the plasma discharge. Hence, the rate of plasma processing can be increased with higher power density of plasma discharge. Atmospheric pressure plasma can be generated by trapping the ions in the medium after ionizing the gas molecule. The particular functionality improvement of the textile requires a particular chemical compound to be generated in the plasma. Hence, the gas selection depends upon the type of surface modification required on the textile. The atmospheric pressure plasma formation in He, Ar medium is less complex than in air medium. Because, the ionization potential of the He and Ar gases are very less as compared to air. Therefore, less voltage is required across the electrode to generate uniform plasma with He/Ar gas. But, these gases are very costly and hence, are not economically viable solutions for the in-line treatment processes.

For air, the ionization potential is very high compared to He, Ar gases. Because of this high ionization potential, the discharge transition from corona to arc or streamers takes place very fast. To avoid this transition and to generate uniform glow in air, the discharge voltage and current need to be quickly sensed by fast feedback control mechanism and activate upon quickly to maintain the voltage and current in order to keep the discharge in glow discharge regime. Uniform plasma can be generated easily in vacuum (at low pressure). However, it requires a vacuum system which is limited to batch processing only. In textile applications, continuous processing is required in order to meet large production rate and hence, plasma treatment can be done only at atmospheric pressure for in-line process. The design of a suitable dielectric barrier discharge system which plays important role in generating uniform plasma will be carried out in this work along with the design of a close loop feedback control system. The power supply and feedback will be tuned to obtain maximum power density of the dielectric barrier discharge load which will enable the fast treatment at a rate of around 20 - 40 meter per minute.

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MEMORANDUM OF UNDERSTANDING (MOU)

BY



INSTITUTE FOR PLASMA RESEARCH (IPR)

Gandhinagar (Gujarat)

AND



**CENTRE FOR CELLULAR AND MOLECULAR
PLATFORMS (CCAMP)**

Bengaluru, Karnataka

FOR

**Improving, developing and translating different plasma-
enabled technologies developed at IPR for applications
in life-sciences**

JANUARY 2021

EFFECTIVE DATE: This MOU is executed on 07/January/2021 between

PARTY 1: Institute for Plasma Research, (a grant-in-aid Institute of Department of Atomic Energy, Government of India) having its registered office at Bhat village, Near Indira Bridge, Gandhinagar – 382428, Gujarat, India and acting through its Facilitation Centre for Industrial Plasma Technologies located at A-10/B, GIDC Electronics Estate, Sector 25, Gandhinagar – 382016, Gujarat, India; (Hereinafter referred as "IPR")

PARTY 2: Centre for Cellular and Molecular Platforms, (An initiative of Department of Biotechnology, Government of India), located at GKVK Campus, Bellary Road, Bangalore-560065, Karnataka, India (part of the Bangalore Life Science Cluster); (Hereinafter referred as "C-CAMP")

Whereas, both IPR and C-CAMP will be jointly referred to as "PARTIES" and individually referred to as "PARTY";

Whereas, "The IPR has developed proof of concept with regard to different plasma-enabled technologies in the form of working experiments/devices, which could have potential applications in life sciences and seeks to further translate these into innovative commercial solutions for society";

Whereas "C-CAMP is the leading bio-innovation hub in India for supporting researchers and fostering innovations. Through its Discovery to Innovation Accelerator (DIA) program, C-CAMP is pursuing active translation of basic science discoveries from academic sector into impactful innovations useful for society, and is always looking to collaborate with more Indian academic organizations for this purpose."

Whereas "IPR & C-CAMP wish to collaborate on further improving, developing and translating different plasma-enabled technologies developed at IPR into innovations with potential applications in life-sciences and beyond, in areas such as human and animal health-care, agriculture, and environment"

Whereas, "As a part of the **Discovery to Innovation Accelerator (DIA) program**, C-CAMP has agreed to collaborate and carry out necessary Research and Development (R&D) steps related to validation of the technology and to translate different plasma-enabled technologies From IPR, thereby assisting in creation of industry-ready innovations. This would involve translational lab-work and optimizations, industry connect, and commercial transfer."

As per the schedule and terms agreed mutually, now thereof the PARTIES enter into this MoU:

1. OBJECTIVE:

The purpose of this MoU is to "Enable a collaboration between Centre for Cellular and Molecular Platforms (C-CAMP) and Institute for Plasma Research (IPR) to enable the translation and commercialization of societally relevant technologies from IPR".

2. METHODOLOGY:

a) This will be an umbrella agreement/MoU wherein the overall objective and direction of



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the collaboration is defined. Subsequently, after interactions, specific task agreements/activities involved along with relevant details for each project, which will be chosen for translation and technology transfer/commercialization, will be set forth in the form of a Research Project Specification (to be added as and when required) and will be considered as an addendum to this agreement and will be implemented under this MoU.

- b) Both IPR and C-CAMP will undertake rigorous discussions and interactions, and will identify societally relevant technologies developed by IPR which can be translated to commercializable technologies in the field of life-sciences and beyond
- c) Both PARTIES will work out the detailed plan on the translation activities involved to convert a lab scale product or knowledge (of above identified technologies) into commercializable technologies such as but not limited to validation trials, product design to suit end application, statutory & regulatory approvals etc.
- d) Both PARTIES will sort out how to raise funds to execute the above proposed translational activities, which includes submission of project proposals to funding agencies
- e) Both PARTIES will attempt to pursue commercial deployment of the technologies

3. SCOPE OF WORK:

The scope of work shall include:

- Identify societally relevant technologies developed by IPR that could have high-impact potential applications in the field of life-sciences and beyond
- Conceive the commercializable, market-friendly form of these technologies that could be deployed in society
- Assess the market and societal impact of the chosen technology in their ready form
- Identify the steps required to convert the chosen technology into an innovative market-ready solution and create a blue-print for the translation process
- Develop and iteratively modify technologies based on translational inputs
- Raise funds for carrying out the necessary translational work, patenting and commercialization
- Carry out the necessary translational work, with guidance and mentorship from academic and industrial partners
- Create and Secure the Intellectual Property (IP) rights for the developed innovations
- Commercialize the technology to relevant industry and facilitate their deployment in society

4. ROLES & RESPONSIBILITIES:

Both PARTIES:

- a) Both PARTIES will work to **identify** high potential, high impact technologies from IPR, **conceive** their commercializable forms and **assess** their potential impact in life-sciences
- b) Both PARTIES will make diligent efforts to meet the roles and responsibilities in a timely manner. Both PARTIES will work jointly to **create and secure** Intellectual Property (IP) Rights for the developed innovations
- c) Both PARTIES will leverage their associated technology transfer machinery for accelerating **technology transfer/commercialization** of developed innovations.



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Scope of IPR

- a) IPR will provide rights to develop and information on different plasma-enabled technologies to C-CAMP for the purpose of translation and commercialization.
- b) IPR will provide plasma technologies selected for translation, along with any help required with the necessary instrumentation.
- c) IPR will also help to subsequently **develop** and **iteratively modify** the given technologies based on translational inputs, and will continue to academically guide and help with the basic science involved in the execution, optimization and modification of these technologies at different stages of the research-translation process.

Scope of C-CAMP

- a) C-CAMP will **identify** and **carry out** all the translational steps including all the experiments, characterization, and analysis required for converting the lab-scale findings and utilities of different plasma-enabled technologies from IPR into innovative solutions that could be commercialized.
- b) C-CAMP will also look to attract investors, and interact with external experts, regulatory bodies, Government agencies and private organizations necessary for the translation and commercialization process.
- c) C-CAMP will also actively engage with industry, both local and global, throughout the translational process to further commercialize the technologies by leveraging the DAE and/or C-CAMP commercialization cell (to be decided by the two PARTIES based upon the requirement), and accelerate their deployment into society.

5. BUDGET:

- a) Both PARTIES will work out budget involved for translation of each technology as identified under clause 2a of this MoU.
- b) No finances are involved under this agreement until the identification of each technology is done. Till then, both PARTIES will bear their own expenses.
- c) The budget for each identified technology will be as prepared and submitted to relevant funding agency and shall be valid as addendum to this agreement.

6. CONFIDENTIALITY:

All information under the MoU shared between the PARTIES shall be treated as confidential information and shall be subject to restrictions on disclosure other than for the purpose of this MoU.

The Recipient shall take the same degree of care as for its own information of like importance in safeguarding against the disclosure of Confidential Information received from the Discloser. The Recipient agrees not to make any use whatsoever at any time of such Confidential Information for any purpose except for the objectives intended to be achieved through this agreement.

Recipient shall promptly notify the Discloser upon discovery of any unauthorized use or disclosure of the Confidential Information received from the Discloser and take reasonable steps to regain the possession of such Confidential Information and prevent further unauthorized actions or other breach of this Agreement.



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The Receiving Party may disclose part of the Confidential Information with prior written consent of the Disclosing party to contractors/agents/consultants/employees engaged by the Receiving Party for execution of any relevant work, to the extent necessary to enable them to perform their duties, provided that the Receiving Party shall impose on such contractors/ agents/consultants/employees the same secrecy obligations as those stipulated in this Article

The confidentiality obligations shall survive even after the termination or expiration of this MoU. Confidential information shall not include:

- a) information that is available in public domain;
- b) information already known to the receiving PARTY;
- c) information disclosed to the receiving PARTY by a third party not under obligation of confidentiality;
- d) Information developed by the receiving PARTY independent of the confidential information received under this MOU.

7. PUBLICATION

The IPR and C-CAMP shall consult in writing for any publication of the proposed project. Either PARTY can impose a delay if any Intellectual Property Right (IP Right) has to be captured, with any delay not exceeding 3 months. Each PARTY shall ensure due authorship is given to contributors from both PARTIES.

8. INTELLECTUAL PROPERTY RIGHTS :

- a) "**Intellectual Property**" means the legal rights relating to inventions, patent applications, patents, copyrights, trademarks, mask works, trade secrets, and any other legally protectable information, including computer software, first made or generated by such investors.
- b) **Background Intellectual Property:** The "**Intellectual Property Rights (IP Rights)**" for any background work already done and secured by IPR on any such technologies will stay with IPR. Similarly, any of background **IP Rights** of C-CAMP will stay with C-CAMP. Nothing in this MoU will change a PARTY's ownership to its IP (background IP) which it brings to the Project. Any of the PARTY possesses rights in background intellectual property, that is, intellectual property not otherwise subjected to this MoU, which would be useful or essential to the practice or commercialization of the results of this MOU, should be disclosed. Except to the limited extent required to perform a PARTY's obligations under this MoU, neither PARTY receives any right, title, or interest in or to any Research Materials provided to it by the other PARTY or any technology, works or inventions of the other PARTY that are not Research Program Inventions, or any patent, copyright, trade secret or other proprietary rights in any of the foregoing.
- c) **Foreground Intellectual Property:** Any new "**Intellectual Property Rights (IP Rights)**" generated during the course of the project/s will be jointly owned by IPR and C-CAMP. This also includes any modifications, improvements, or discoveries relating to projects made jointly by both the PARTIES, which are identified by either of the PARTIES as potentially patentable or copyrightable subject matter, shall be jointly owned by IPR and C-CAMP, and would be subject to rights described in this document. The filing of such patent applications would be done through the DAE patent cell or through the patent cell at C-CAMP (to be decided by the two PARTIES based upon the requirement).



- d) **Patent Prosecution and Expenses:** The expenses for filing, prosecution, defense and maintenance of all foreground IP Rights for the Inventions will be jointly borne by IPR and C-CAMP.
- e) **Maintaining the Laboratory Notes:** Each PARTY agrees that research efforts will be well documented in the form a laboratory notes with accurate data disclosed for each experiments performed therein, during the course of this MOU.
- f) IPR will be free to discuss, pursue and exploit the knowhow and Background Intellectual Property held by it with other parties, and nothing herein shall hold IPR exploiting the IP Rights with other parties of any violation under law or under the obligations of this Agreement.
- g) Clause 6 of the MoU shall survive the termination/expiry of the MoU and the terms of the said clause shall be legally binding on the PARTIES, irrespective of the validity of the MoU.

9. **TERM AND TERMINATION:**

This MoU shall be valid for a period of **Five (05)** years from the Effective Date and can be terminated by a notice of six months by either PARTY. The termination of this MoU shall not affect any IP Rights accrued and related obligations arising under this MoU. The MoU may be amended or the term extended in writing, only by mutual consent and with the signatures of the Authorized Signatories of both PARTIES.

10. **INDEMNIFICATION:**

Receiving Party shall hold harmless and indemnify the Disclosing Party and keep it always indemnified for any loss incurred or suffered by the Disclosing Party arising out of a breach by the Receiving Party or its contractors/agents/consultants/employees of their obligations under this agreement.

Neither PARTY warrants that the use of Foreground IP or Background IP or other Confidential Information does not infringe third Party's rights or does not cause damage to third Parties.

Force Majeure: If the performance by a PARTY of any of its obligations under this Agreement (except a payment obligation) is delayed or prevented by circumstances beyond its reasonable control or events such as acts of God, War, Flood, Earthquakes, Strikes, Lockouts etc., then the said PARTY will not be in breach of this Agreement because of delay in performance. However, if the delay in performance lasts more than 3 months, the other PARTY may terminate this Agreement with immediate effect by giving written notice to the PARTY whose performance is delayed or prevented.

11. **DISPUTE RESOLUTION, GOVERNING LAW AND JURISDICTION**

Any disputes or differences between the PARTIES in relation to or arising under this agreement shall be resolved by mutual discussions by the undersigned. Minor dispute during execution of the project shall be subjected to resolution by **the undersigned**. However, in event of disputes or differences being not resolved through mutual discussions, the matter shall be resolved by a sole arbitrator mutually appointed as per the provisions of Arbitration & Conciliation Act, 1996 or any statutory modifications or re-enhancements thereof for the time being in force.



The validity, construction and obligations of this MOU shall be governed by the laws of India. The Courts in Gandhinagar, India shall have exclusive Jurisdiction to try all disputes arising out of this MoU, to the exclusion of all other Courts.

PARTY 1:

For and on behalf of Institute for Plasma Research (IPR), Gandhinagar, Gujarat

By: [Signature]

Name: ARUN KUMAR CHAKRABORTY

Title: Sr. Purchase Committee Chairman

Dated: 07- JAN - 2021

Place: Gandhinagar

Seal:



Witnessed by: [Signature]

Name: Alphonsa Joseph P

Title: PSE D- Head

Dated: 11-01-2021

PARTY 2:

For and on behalf of Centre for Cellular and Molecular Platforms (C-CAMP), Bengaluru, Karnataka

By: [Signature]

Name: Wg Cdr (Retd) K F J

Title: General Manager - Admin and I
Centre for Cellular and Molecular Platforms
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Dated: 25 Jan 2021

Place:

Seal:



Witnessed by: [Signature]

Name: Vishal Bhardwaj

Title: Scientific Consultant, C-CAMP

Dated: 25-01-2021

Addendum

Research Project Specification - NNN

Upon execution by the PARTIES below, the Activity specified herein shall be awarded and performed in accordance with the "Memorandum of Understanding (MoU)" effective 21/August/2020 (which is incorporated herein in its entirety) between Institute of Plasma Research (IPR) and Centre for Cellular and Molecular Platforms (C-CAMP).

The Research Project Specifications shall include the following information:

1. **Research Project Title:**
2. **Principal Investigator(s):**
3. **Attach a Statement of Work:**
A description of work to be performed by each PARTY. Describe with particularity those aspects of the work that are considered "Confidential".
4. **Standards of Performance:**
Any applicable standards to which the work must conform to.
5. **Duration of Project:**
A schedule for the performance of the research described in the statement of work
6. **Specifies Deliverables Items (if any):**
Identify any creations (devices, samples, data, reports, etc.), if any, that shall be created from this work that will be delivered. Identify each such creation that shall not be delivered as well...
7. **Proposed Visitor(s) (if any) and duration of visit:**

Research Project Authorization:

C-CAMP:

Name
Title
Date

IPR:

Name
Title
Date





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ક્ર. ૩૩૪..... વારીસ સંખ્યા ૨૦૧૧/૧૨૩
નામ શ્રી. મણીભાઈ દાસરાણા મહારાજ
અભ્યાસુ અ.ર. હોટેલ તરફ મોકલવા
ગાંધીનગર અ.ર. હોટેલ રોડ મેલ રૂમ
શાંતી હીરોચંદ્ર મોહલદાસ (_____)
તા. નં. - ૦/૨૦૦૭
રૂ. ૧૦૦/-

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding is executed this 3rd day of July, Two Thousand Seven by an between the INSTITUTE FOR PLASMA RESEARCH (An Autonomous Institute of Department of Atomic Energy, Government of India) located at Bhat Village, Nr. Indira Bridge, Gandhinagar - 382 428, Gujarat, India; acting through its Facilitation Centre for Industrial Plasma Technologies situated at B-15-1/2/P, GIDC Electronics Estate, Sector 25, Gandhinagar - 382 044, Gujarat, India herein after referred to as 'ICPI/IPR', (which expression unless repugnant to the context shall include its successors, and assigns) on one part;

AND

Shri Raghavendra Technical Services Pvt. Ltd. a private limited company incorporated under the companies Act 1956 and having its registered office at Shagun Apartment, Satellite, Ahmedabad - 380015, Gujarat India herein after referred to as 'SHREE (which expression unless repugnant to the context shall include its successors, agents and assignee) on the second part; AND collectively referred to as 'Parties';

WHEREAS

- [1] FCIPT/IPR is involved in research and development of processes and plants utilizing plasma technology for use in surface engineering, mineral processing, pyro-metallurgy, ceramics, waste remediation and other areas where opportunities are identified.
- [2] FCIPT/IPR has already developed high power torches and thermal plasma systems and associated equipment for the technology of plasma pyrolysis for safe disposal of medical & plastic waste and holds the intellectual property rights for this technology for disposal of medical & plastic waste.
- [3] FCIPT/IPR has identified Plasma assisted Waste Processing" (hereinafter referred to as 'PWP') as a core area for its future plans of technology development, which includes:
 1. Developing plasma torches and associated systems for waste treatment.
 2. Development of technologies relevant to all manner of waste destruction, remediation and waste to energy conversion.
 3. Scaling up the present capabilities to industrial scales, and for the treatment of products of plasma-waste interaction.
- [4] SHREE is involved in the business of manufacturing, assembly and installation of plasma based industrial application which includes:-
 - a) Plasma torches and power supplies
 - b) Waste feeding system
 - c) Thermal oxidizer for combusting volatile organic compounds coming from the reactors
 - d) Refractory lined reactors

DEFINITIONS

For the purposes of this Agreement the following terms shall be defined as under:

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1. "Background Intellectual Property" shall mean the Intellectual property created or owned by either of the Parties prior to the execution of this Agreement including but not limited to inventions, patents, trademarks, copyrights, computer software, analysis techniques and trade secrets conceived and/or first implemented to practice either prior to or outside the scope of this agreement.
2. "Intellectual Property" means any intellectual property, including, without limitation, any inventions, improvements and discoveries, including all computer software, works, material and data.
3. "Effective Date" shall mean the date when all parties sign this Agreement.
4. "Plasma-assisted Waste Processing (PWP)" shall mean pyrolysis, gasification or vitrification of all forms of waste feed stocks through the mediation of plasmas and realized by the use of a combination of the following sub-systems: -
 1. Plasma torches in all power range with various electrode materials and geometries.
 2. Arrangements for manipulation of the torches.
 3. Power supplies for energizing the torches
 4. Chamber for interaction of waste with plasma
 5. Equipment for pre-treatment of waste and introducing the waste into the treatment chamber
 6. Systems for introducing required endogenous or exogenous gases including air
 7. Combustion chambers for burning or imparting other treatments to the gases and vapours produced as a result of the plasma-waste interaction.
 8. Equipment for extracting chemical or thermal energy resident in the product gases.
 9. Equipment for extracting the solid and liquid residue after the plasma-waste interaction.
 10. Instruments for measuring various parameters relevant to the operation.

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11. Control and automation systems for the operation of the above systems

AND WHEREAS in consideration of advantages of synergy between the two parties and to avoid potential conflict of interest, both the parties have agreed to arrive at an understanding which is recorded hereunder: -

1. FCIPT/IPR will act as the sole agency for identifying opportunities, holding techno-commercial discussions with vendors and industries interested in exploiting plasma based waste treatment systems and for planning and undertaking research and development activities related to PWP systems.

2. FCIPT/IPR may in its discretion associate SHREE in development, manufacture, assembly and installation, and maintenance of PWP systems, on non-exclusive basis.

3. SHREE shall, at its discretion, undertake the above tasks pertaining to PWP as per guidelines and specifications supplied by IPR/FCIPT based on project agreements entered between the parties from time to time delineating specific scope of work, deliverables and financial terms.

4. SHREE shall maintain confidentiality of the agreements with FCIPT/IPR, over the know-how provided by FCIPT/IPR, which includes design details for fabrication, etc. SHREE shall ensure that the confidential information given by the FCIPT/IPR, either orally or in writing, shall not be disclosed to any third party, under any circumstances, without prior written permission of FCIPT/IPR.

5. In the course of assignment of these tasks by FCIPT/IPR to SHREE, "intellectual property", if generated, shall be shared through a process of mutual agreement.

6. SHREE shall be free to supply commercially proven mechanical sub-systems (as already existent in the market) to parties who are already in the field of plasma technology. Further it can manufacture such sub-systems as per the drawings supplied by party.

7. SHREE is restrained from supplying subsystems for other parties carrying out Research and Development of technology on PWP systems.

8. SHREE shall not assign the benefits and rights under this MoU to any other person without the prior written consent of FCIPT/IPR.

9. The duration of this agreement is initially for a period of 5 years, which is renewable for a further period on mutually agreed terms.

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[Signature]

10. Notwithstanding the duration stated hereinabove, either party to this agreement will be entitled to cancel this agreement by giving prior notice of one month to the other party in any of the following events: -

- (i) If the other party commits breach of any term of this agreement;
- (ii) If the other party goes into voluntary liquidation or is ordered to be wound up by a court of law;
- (iii) If the other party ceases to carry on the stated business;
- (iv) If any event happens which makes the performance of this agreement impossible by reason of any force majeure or otherwise;

11. This agreement embodies the understanding between the parties relating to the subject matter of this agreement and no other term or promise or condition or obligation, oral or in writing, shall be pleaded as agreed upon between the parties relating to this agreement. Any term / clause of separate work order / Job contracts hereinafter to be executed, contrary to the present understanding, shall not be enforceable.

12. Neither Party shall be entitled for any compensation for loss of office/profit on any ground.

The agreement is executed at Gandhinagar and the Courts at Gandhinagar alone to the exclusion of other Courts shall have jurisdiction to try and entertain any suit or legal proceedings arising from this agreement.

In the event of any dispute or difference between the parties hereto regarding the interpretation or meaning of any provision of this agreement or regarding any claim of one party against the other, or regarding any other matter arising out of this agreement, the same shall be referred to arbitration and the proceedings shall be governed under the Arbitration and Conciliation Act with its modification, enactment, re-enactment, if any, from time to time.

All notices and other communication required or permitted to be given under this MOU shall be in writing and shall be deemed effective upon (a) personal delivery, (b) confirmed transmission of facsimile, (c) five (5) days after deposit in the Indian Post Office, by registered or certified mail, postage prepaid, or (d) one (1) day after deposit with any reputable express courier for overnight delivery, and addressed to the parties at their respective addresses set forth below unless by such notice a different person or address has been designated

Abhishek

[Signature]

IN WITNESS WHEREOF THE PARTIES HERETO HAVE SET THEIR RESPECTIVE HANDS TO THIS AGREEMENT ON THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

SIGNED AND DELIVERED on behalf of *Institute for Plasma Research*

D. Anura Lakshy

Chairman - Sr. Purchase Committee
Institute for Plasma Research
Gandhinagar



In the presence of:

1. *S. Muthuraj*
S. Muthuraj, FCIPT/IPR, Gandhinagar

SIGNED AND DELIVERED on behalf of *Shree Raghavendra Technical Services Pvt. Ltd.*

N. Venk

Director
Shree Raghavendra Technical Services Pvt. Ltd.
Ahmedabad



In the presence of:

1. *K.C. Ganesh Prasad*
Dy. K.S. Ganesh Prasad

Memorandum of Understanding

Between

Johnson & Johnson Limited, India
30 Forjett Street, Mumbai 400 036, India

and

Facilitation Centre for Industrial Plasma Technologies
A Division of Institute for Plasma Research,
B-15-17/P Sector 25, GIDC Electronics Estate
Gandhinagar 382 044, Gujarat, India

Project: Research and Development of an
Energy Recovery Process using Plasma Technology

This MOU dated ~~October 6, 2000~~ confirms the broad terms and conditions upon which Johnson & Johnson Limited, India (J&J) AND Facilitation Centre for Industrial Plasma Technologies, Institute for Plasma Research (FCIPT) have agreed to work jointly on the project "Research and Development of an Energy Recovery Process using Plasma Technology" (hereinafter referred to as "The Project"):

1. Details of the Project:

- (i) FCIPT is involved in Plasma Research and developing Plants & Processes utilising plasma technology for use in surface engineering, mineral processing, pyrometallurgy, ceramics, waste disposal and other such areas where opportunities are identified.
- (ii) FCIPT has already developed a process for safe disposal of medical waste using plasma pyrolysis in which useful gases are generated.
- (iii) FCIPT in view of their experience in the field of plasma technology has evidence to believe that the useful gases generated during the pyrolysis process has the potential to be converted into useful energy which can be recovered by the development of an appropriate system for the purpose.
- (iv) The basic features of the project involve a non-equilibrium plasma reformation system using plasma generators for the optimization of gas quality and other properties from which energy can be harvested by appropriate techniques.

Am

Vinod K. A.
6/10/2000

2. Representations:

- (i) The Corporate Office of Science and Technology (COSAT) of J&J, USA has identified this project as a frontier technology area and consequently J&J expressed its willingness to collaborate with the FCIPT in carrying out research activities on this project with the ultimate objective of converting the results into commercially viable energy recovery units.
- (ii) J&J hereby agrees that the company will sponsor and finance the project being undertaken by FCIPT.
- (iii) The intellectual property rights based on the research results generated by FCIPT will be exclusively assigned to J&J for development and cocommercialization on terms mutually agreed between FCIPT and J&J prior to commercialization of the project.
- (iv) FCIPT and J&J will workout a detailed implementation plan for the smooth and expeditious working of the project.

3. Funding of the Project:

- (i) J&J shall release the funds to FCIPT for "The Project" based on the project cost agreed upon by the parties towards the expenses, incidental charges and cost incurred by FCIPT. The disbursements shall take place, as and when FCIPT intimates such cost in such instalments as may be mutually decided.

4. Patents for Invention & Proprietary Rights:

- (i) The patentability of the inventions and filing of patent applications will be discussed between FCIPT and J&J and all assistance for the filing and prosecution of the applications in the designated countries will be provided by J&J to FCIPT. Their advice on this matter will be final. Expenses for the priority PCT application will be borne by FCIPT while expenses for the filing, prosecution and maintenance of national applications will be met by J&J.
- (ii) J&J will have exclusive rights on exploitation of the intellectual property generated by FCIPT under this project and in the event that J&J does not directly commercialize, they will be at liberty to license the invention to third parties for commercial exploitation. The terms for commercial use of the invention by J&J or its licensee will be mutually agreed upon before products or processes emanating from this project are commercialized.

Am *Vinayak.H.*
6/10/2000

5. **Conflict of Interest:**

- (i) FCIPT has made disclosure to J&J that FCIPT shall not undertake at any time, in future, for any other person or organization, assignment similar or conflicting with the project covered hereunder.

6. **Confidentiality:**

- (i) FCIPT agrees that except with the consent of J&J, all information generated under this project whether written or otherwise, shall be kept in strict confidence and shall not be disclosed to others or used by FCIPT for own benefit or for any purpose. FCIPT also agrees to restrict dissemination of such information only to those who have any actual need to know and have a legal obligation of FCIPT to protect confidentiality of such information. The confidentiality obligation shall survive despite any termination of this MOU.

7. **Development Team:**

- (i) FCIPT shall designate and disclose names of the Team Members working on the project. The Team Members will utilise facilities of FCIPT and submit periodical report, as may be directed by J&J from time to time.

8. **Proprietary Information:**

- (i) The research findings, analytical method developed and / or any useful information gained in respect of "The Project" by FCIPT shall be the sole proprietary information and property of J&J. It is expressly agreed and understood that neither FCIPT nor any member of the Research team working on "The Project", will have any right or claim in respect of the findings of "The Project" or any information derived during the course of the project, for any commercial use. Further, neither FCIPT nor any member of the Research team shall publish any scientific papers, articles, and information regarding the project, in any manner, without the express permission in writing from J&J.

This Memorandum of Understanding sets forth broad terms agreed between the parties relating to the subject matter hereof. J&J shall in relation to the project be entitled to add or delete such other terms and conditions by mutual consent and FCIPT shall agree to such terms if they are reasonable and necessary for accomplishment of overall objective of the Agreement.

 - 1 -
 6/10/2000

Please confirm that the foregoing is in accordance with our understanding by signing and returning to us this Memorandum of Understanding which shall thereupon constitute a binding agreement.

For Johnson & Johnson Limited



Mr. Ram Vaidya


A.V. Chakraborty

Facilitation Centre for Industrial
Plasma Technologies



Prof. P.I. John

Annexure

Objectives

1. Optimization of the Plasma Pyrolysis and post-treatment process for efficient conversion of waste into clean and valuable gaseous products primarily hydrogen and carbon monoxide which can be burnt to release the highest possible quantity of heat and
2. Quenching of the hot gases to transfer their heat to water, which can be subsequently recovered.

Execution

1. Phase manner of the project
2. Gantt chart - activity, responsibility, time
3. Team formation from FCIPT - Project owner/leader
4. Funding from COSAT - J&J India - FCIPT
5. Monthly report with respect to GANTT chart

Annexure

Vinay R. S.
6/10/2010