

# **MEMORANDUM OF UNDERSTANDING (MOU)**

**BETWEEN**



**TERMINAL BALLISTICS RESEARCH LABORATORY**

**Sector 30, Chandigarh**

**and**



**PANJAB ENGINEERING COLLEGE,  
CHANDIAGARH**

This MoU is made and entered on this 01 day of August in the year 2023.

**Between**

The President of India, acting through and represented by the Director, Terminal Ballistics Research Laboratory, DRDO, Ministry of Defence, Govt. of India, Sector-30D, Chandigarh (hereinafter called **TBRL**, which shall, unless the context does not admit, include its successors and assigns), on the ONE PART.

and

**Panjab Engineering College, Chandigarh** a premier academic Institution of international repute and having its registered office at Sector 12, Chandigarh 160012, (hereinafter referred to as **PEC**, which term shall unless repugnant to context mean and include its successors in interest, office and permitted assigns) of the OTHER Part.

This MoU sets down the mutually agreed broad framework for joint R&D and academic activities in various fields of interest. It also incorporates the modalities for collaboration. For the purpose of this MoU, **TBRL** and **PEC** shall be collectively referred to as "parties" and the term "party" refers to either of them as the context permits.

**PREAMBLE**

Terminal Ballistics Research Laboratory, Chandigarh is one of the pioneer laboratories of the Missile & Strategic Systems Cluster working under the Defence Research & Development Organization. Currently, TBRL has its administrative wing at Chandigarh whereas all the technical and experimental activities are carried out at the TBRL Ranges at Ramgarh in Distt. Panchkula (Haryana). The Technical areas is divided into several technical areas which are equipped with highly specialized instruments and diagnostic facilities, generating critical inputs for the design and development of warheads and other armament systems. TBRL has carried out pioneering research in the fields of Explosives, Detonics and Shock Waves, Shaped Charge Technology, Warhead Design, Blast & Damage, Lethality & Fragmentation, High Strain Rate Studies, Ballistic Evaluation of Materials, and other aspects related to Terminal Ballistics.

**PEC Chandigarh** is a premier academic institution of the country, possessing a team of highly competent, motivated scientists/ engineers and experts in their respective domains who are engaged in teaching and carrying out research of significance to develop cutting edge technologies. **PEC Chandigarh** is actively engaged with defence and security forces through its various departments through research projects.

## RECITALS

### **1. DEFINITIONS**

- 1.1 "**Memorandum of Understanding**" herein referred to as "MoU", shall mean this Memorandum of Understanding and all modifications thereto from time to time and the attachments, annexure, letters written in pursuance to implementation of this Memorandum of Understanding and Schedules hereto unless specifically referred to other Memorandum.
- 1.2 "**LAWs**" OR "**Law**" shall mean and include laws, judgements, decrees, injunctions, writs, orders and stipulations of any court, arbitrator or governmental agency or authority and statutes, rules, regulations, orders and interpretations thereof of any national, state, local, municipal, regional, or other government body instrumentality, agency, authority, court or other body having jurisdiction over the Parties herein.
- 1.3 "**PARTY/IES**": "First Party" and the "**PEC Chandigarh**" hereinafter, individually or collectively referred to as the "Party" or the "Parties" as per the context.
- 1.4 "**EFFECTIVE DATE**": Effective Date is the date of execution of this MoU.

### **2. INTERPRETATION**

- 2.1 This MoU shall ensure to the benefit of the Parties hereto and their successors.
- 2.2 The singular includes the plural and vice versa and, in particular (but without limiting the generality of the foregoing) and word or expression defines in singular has the corresponding meaning when used in the plural and vice versa.
- 2.3 Any reference to either gender includes the other gender.

2.4 Where a word or phrase is defined, other parts of speech and grammatical forms of that word or phrase shall have the corresponding meaning.

2.5 A reference to a Party includes that Party's successor and permitted assigns.

2.6 Any reference to "writing" includes printing, typing, lithography, electronic/digitally stored or communicated and other means of reproducing words in visible forms.

2.7 "Material Breach" is a non-compliance of material terms of MoU by either party.

### **3. PROPOSAL**

Both parties desire to implement various collaborative R&D activities, in areas of mutual interest, which would address multidisciplinary scientific and technological issues of national relevance. **TBRL** and **PEC Chandigarh** agree to cooperate in the following areas through (a) Exchange of scientific and teaching materials (b) Joint research projects (c) Start-ups and (d) Internships and manpower training;

- a. High strain rate and shock wave studies on materials (metal alloys, polymers, ceramics and composites) for development of advanced light weight armour materials.
- b. Finite element analysis and numerical simulation techniques to study impact and blast response of materials.
- c. Studies on textile and polymer materials for light weight armour materials.
- d. Digital Image Correlation and Signal Processing, Sensor Instrumentation and Sensor Data Fusion.
- e. MEMS based sensors and Data Acquisition Systems.
- f. Development and characterization of blast mitigation materials.
- g. Design of mechanical systems for various armament applications.
- h. Design & development of VLSI and embedded systems.
- i. Power electronics and high voltage engineering.
- j. Synthesis and characterization of green and Eco-friendly high energy materials.

- k. Modeling, simulation and control of dynamics of physical systems.
- l. Mechatronics.
- m. Heat transfer, Computational Fluid Dynamic and Finite Element Methods.
- n. Green composites / polymeric composites.
- o. Polymeric composites reinforced with nanoparticles.
- p. Preparation of light weight water / acid-base/ solvent resistant composites.
- q. Piezoelectric and ferroelectric materials.

#### **4. REPRESENTATION AND WARRANTIES BY PARTIES**

Each Party to the MoU hereby represents and warrants to each of the other Parties that, as of the Effective Date:

- 4.1 Execution of this MoU shall not oblige the parties to conclude definitive agreement between them.
- 4.2 Each party shall be solely responsible for its own actions or failure to act and for its own commitments and undertakings. None of the parties shall resent itself as the representative or agent of the other parties nor shall it have the power or the authority to commit the other party, unless it receives the other party's prior written consent.
- 4.3 No party shall have the authority or right, nor shall any Party hold itself out as having the authority or right to assume create or undertake any obligation of any kind whatsoever, expressed or implied nor accept service of any legal process on behalf of or in the name of any other Party without the express prior written consent of the other Party.
- 4.4 Unless specifically authorized, no party, or its representative shall be deemed to be a representative, agent or employee of any other party.
- 4.5 Should any contract resulting from the activities of the Parties under this MoU be subject to laws, regulations, licenses and approval as required by the Government of India, both the Parties shall be responsible for obtaining such licenses and approvals from the Government of India.

## **5. RIGHTS AND OBLIGATIONS OF PARTIES**

- 5.1 All rights and obligations of the parties regarding their specific actions pursuing the objectives specified in **clause 3** of the MoU, as well as those related to entering into and execution of any contracts required to implementation of such acts will be set forth in “**relevant definitive agreement**” specifying the scope, terms and conditions of their engagement, obligations and deliverables after arriving at mutually acceptable arrangement.
- 5.2 However, it is clarified that execution of this MoU shall not oblige the parties to conclude definitive agreement between them or pursue any further business relationships.

## **6. EXCLUSIVITY**

Nothing of this MoU shall be binding on TBRL or **PEC Chandigarh** for exclusivity in providing the technologies to EITHER PARTIES only. Both the parties are at liberty to enter in an agreement/ MoU with third party (ies). However, the technologies and know how imparted by either party shall be governed by the **clause 4**.

## **7. TERMS AND TERMINATION**

This MoU shall be valid for period of 5 years and will terminate, except for the clauses regarding proprietary information, the Non Disclosure Agreement and dispute resolution which shall survive such termination as provided in the Non Disclosure Agreement, without which liability of either of the Parties hereto, upon mutual written agreement between the Parties.

## **8. COOPERATION**

- 8.1 The parties shall respectively co-operate with each other to ensure that all information necessary or desirable for the making of (or responding to any requests for further information consequent upon) any notifications or filings made in respect of the MoU, or the transactions contemplated by this MoU, is supplied to the Party dealing with such notifications and filings and that they are properly accurately and promptly made.

8.2 This MoU shall act as a Generic/ Umbrella MoU. Further the parties shall decide the scope of co-operation by negotiating mutually agreeable work share and cost separately, for each joint activity undertaken.

#### 8.3 Joint Supervision for Ph.D

- a) Ph.D. students from PEC can be co-supervised by scientists of TBRL.
- b) Faculty from PEC can be doctoral committee members of TBRL scientists pursuing Ph.D.
- c) With due permission, students/faculty/scientists from either party can work in the other institute and use the facilities for collaborative projects. Either party will provide accommodation whenever possible to the visiting scientists/students/faculty at applicable charges.

#### 8.4 Joint Academic Programs

- a) Admission to Ph.D. and PG Programmes for TBRL scientists/officials /employees would follow the admission rules and regulations of PEC, in areas of common interest. Waiver of entrance test to be considered for senior scientists having a research experience of equal to or more than 12 years.
- b) Provision for special classes on weekends for the coursework for Ph.D. programme may be made by mutual agreement. Waiver of attendance requirement for course work may be considered by the competent authority for senior scientists having a research experience of equal to or more than 12 years. Provision for Massive Open Online Courses (MOOCs) may be there for such senior scientists.
- c) JRF/SRF at TBRL with DRDO research fellowships, who are GATE/NET qualified shall be eligible for enrollment for Ph.D. at PEC subject to meet laid down admission procedures and qualifications.
- d) Fee structure at par with regular students may be considered for the scientists/officials from TBRL taking admission to Ph.D. and PG Programmes.

## **9. CONFIDENTIALITY**

During the term of the MoU it may be necessary for either Party to provide confidential information to the other in such event, the disclosure and use of all confidential information/proprietary information shall be in accordance with the respective particular event/project on a case-on-case basis, signed between the Parties.

## **10. INTELLECTUAL PROPERTY RIGHTS**

- 10.1 Nothing herein is intended to affect the rights of the Parties with respect to each Party's intellectual property right/knowledge, respectively held, owned or developed by such party. Any intellectual property rights, including information, data know-how, patent, patent applications, and trade secrets, which are owned developed or acquired by a Party ("Background Data"), shall remain exclusively in the ownership of such Party. Nothing contained in this MoU shall be construed as granting, either expressly or by implication or otherwise, any license under any intellectual property now or hereafter or controlled by party hereunder.
- 10.2 With respect to technology and/or technical data generated/developed jointly by the Parties ("Foreground Data"), it is agreed that such Foreground Data, shall be available for use and tech-transfer or commercialization to the Indian MOD as may be statutorily required by the terms & conditions drawn up by the MOD, under a separate agreement. Under no circumstances the technologies developed jointly shall be sold or exposed wholly or partly to any other agency in India or abroad without written mutual consent.

## **11. COSTS**

- 11.1 Both Parties have agreed that the expenditures shall be borne by each party shall be worked out separately after negotiations on commercial terms and conditions.
- 11.2 Each party may set their own infrastructures at their work places including manpower, test rigs/tracks etc. at their own expenses without any obligation to each other.

## **12. FORCE MAJEURE**

Neither of the Parties shall be responsible for non-fulfilment of its respective obligations under this MoU due to the exigency of one or more of the Force Majeure events such as but not limited to floods, earthquakes, acts of God, war, strike, lockouts, epidemics, riots, civil commotion, server problem internet related issues, power problem, government restrictions, catastrophe, or disturbances in the country. Either Party, if affected by an event of Force Majeure shall give a notice in writing to the other within ten working days of such occurrence or cessation. If the Force Majeure condition continues beyond one month, the parties shall mutually decide about the future course of action.

## **13. GOVERNING LAW AND JURISDICTION**

This MoU shall be governed by and construed in accordance with the laws from time to time in force in India, and the parties irrevocably submit to authority of the Courts having jurisdiction at Chandigarh UT.

## **14. LEGAL COMPLIANCES**

The parties shall take care of any legal compliance as may be required during the process of executing this transaction of their respective authorities. Further, the parties shall communicate and coordinate for compliance with the laws.

## **15. LIMITATION OF LIABILITY**

The Parties (including for this purpose their respective Affiliates) shall not be liable for each other's incidental, indirect, special or consequential damages (including lost profits or lost revenues) under this MoU, regardless of whether such liability arises in tort, contract, breach of warranty, indemnification or otherwise.

## **16. ENTIRE MoU**

This MoU sets forth the entire understandings between the Parties as to the subject matter to this MoU and supersedes, cancels and merges all agreements, negotiations, understandings, commitments, writings and discussions between them as to the subject matter and supersedes all prior agreements and understandings whether oral or written with respect thereto and no variation of the MoU shall be effective and neither of the Parties shall be bound by any

conditions definitions, warranties, or representations with respect to such subject matter, other than as expressly provided in this MoU or as duly set forth on or subsequent to the date of execution hereof in writing and signed by proper and duly authorized officer of the party to be bound thereby.

## **17. SEVERABILITY**

Any provision of this MoU that is prohibited or becomes unenforceable under the laws of any jurisdiction which affects the performance or enforceability of the MoU shall, with respect to that jurisdiction, be ineffective to the extent of the prohibition or unenforceability but without invalidating of that provision in any other jurisdiction. Further, the Parties will endeavour, acting in good faith, to agree the terms of a provision, which may be substituted for the invalid, illegal or unenforceable provision.

## **18. ANNOUNCEMENTS**

No release shall be made by any party to the news media or general public relating to the MoU and/or the subject matter thereof without prior written approval of the other party, which approval shall not be unreasonably withheld. The parties further agree that news releases made by either of them shall recognize the participation and contribution of the other party.

## **19. NOTICE**

- 19.1 Any notice issued under the MoU must be in writing and shall be in English language.
- 19.2 Any notice issued under this MoU must be either sent by facsimile, email, post or delivered by hand.
- 19.3 Any notice issued under this MoU must be addressed to either of the parties on the official registered address.
- 19.4 Each party shall appoint an Officer to act as a single point of contact within that party's organization with respect to the MoU and the same shall be communicated to the other party through registered post and email as provided in 19.3. Any change in above point of contact shall be

communicated in writing to the other party through email and Registered post.

- 19.5 A notice sent by email/registered post or delivered by hand is effective upon receipt.
- 19.6 A notice sent by facsimile or email is effective upon the receipt, confirmation or successful transmission to the recipient unless it is transmitted after the closure of normal business hours, or on a Sunday or public holiday in which case it is effective on the opening of business on the next business day at the intended place of receipt.

## **20. RELATIONSHIP OF PARTIES**

The relationship between the parties is limited to the purpose of this MoU as principal to principal and it is not to be construed as a Partnership or as Principal and agent or as trustee and fiduciary or any other special relationship.

## **21. SETTLEMENT OF DISPUTES**

- 21.1 The Parties shall use their best efforts to settle amicably all their disputes regarding the claim by one party against the other or regarding the implementation of the MoU by appointing One Senior person each who would make an effort to resolve the same.
- 21.2 Any differences or disputes or claims arising out of or in relation to this MoU which are not resolved by the Parties amicably, shall be referred to arbitration under and in accordance with the Indian Arbitration and Conciliation Act, 1996.
- 21.3 The arbitral award shall be final and binding upon the parties to the dispute.
- 21.4 The venue of arbitration proceedings shall be in Chandigarh. All proceedings shall be in English and all awards shall be reasoned awards, which will disclose the factual and legal basis for the same.

IN WITNESS WHEREOF, the undersigned, duly authorized thereto, have signed this MOU on this day, August 01, 2023 in two originals in the English language.

**TBRL, Chandigarh**

Name: Prof. Prateek KishoreDirector प्रौद्योगिकी कानूनी एवं निवेदक / OS & DirectorTerminal Ballistics Research Laboratory  
राज्य प्रौद्योगिकी भवन पर्यावरण एवं संग्रहालय  
(DRDO), Sector 30C, Chandigarh  
वैज्ञानिक, २८ मंत्रालय / DRDO, Min. of Def.  
क्षेत्र ३०, चंडीगढ़ / Sector 30, ChandigarhDate: 01 Aug 2023Place: Chandigarh

Witnessed by:

Signed: V Singh 01/08/23Name: VASUDEVHAR A SINGHDesignation: Dean faculty AffairsDate: 01-08-2023Signed: Rajat Kumar 01/08/23Name: RANJEET KUMARDesignation: SC 'F'Date: 01- 8- 2023**PEC, Chandigarh**

Name: Prof. Baldev SinghDirector Punjab Engineering CollegeTerminal Ballistics Research Laboratory  
(Deemed to be University)  
ChandigarhPunjab Engineering College (deemed to  
be University), Sector 12, ChandigarhDate: Aug 01, 2023Place: Chandigarh

Witnessed by:

Signed: Aneesh 01/08/2023Name: ARUN KUMAR SINGHDesignation: Head, SRICDate: 01-08-2023Signed: Dr P. K. SoniName: Dr P. K. SoniDesignation: Sc 'G'Date: 01/8/2023