



# TECHNOLOGY DEVELOPMENT FUND (TDF) SCHEME



## **TITLE: DEVELOPMENT OF ULTRA HIGH POWER SUPER CAPACITORS AND PULSE POWER MODULES ALONG WITH SUPER CAPACITOR MANAGEMENT SYSTEM**

### **1. Objective:**

To design and develop ultra-high-power supercapacitors and pulse power modules integrated with an advanced supercapacitor management system. This project aims to provide robust energy storage and delivery solutions for high-power, short-duration applications in defense and industrial sectors.

### **2. Background:**

Supercapacitors offer rapid charge/discharge capabilities, high power density, and extended life cycles compared to traditional batteries. They are increasingly vital for applications requiring instantaneous power bursts, such as directed energy weapons, railguns, and electric vehicles. Despite their potential, India relies heavily on imports for advanced supercapacitor technologies. Developing indigenous ultra-high-power supercapacitors and pulse power modules is critical for achieving technological self-reliance and meeting defense energy demands.

### **3. Problem Statement:**

The lack of indigenously developed ultra-high-power supercapacitors and integrated management systems limits India's ability to address critical power demands in high-intensity applications. Imported systems are expensive, less customizable, and pose logistical challenges. There is an urgent need for localized development of these technologies to enhance reliability, reduce costs, and ensure scalability.

### **4. Proposed Solution:**

- 1. Supercapacitor Development:** Design ultra-high-power supercapacitors with high energy density, fast charging capability, and long lifecycle performance.
- 2. Pulse Power Modules:** Create scalable, compact modules capable of delivering rapid energy bursts for critical applications.
- 3. Management System:** Develop an advanced Supercapacitor Management System (SCMS) for real-time monitoring, balancing, and fault detection to ensure safe and efficient operation.
- 4. Indigenous Manufacturing:** Establish local production capabilities to reduce dependency on imports and ensure cost efficiency.

**5. Expected Outcome:**

1. Indigenous ultra-high-power supercapacitors and pulse power modules tailored to defense and industrial applications.
2. Enhanced power storage and delivery systems for high-intensity operations.
3. Reduced dependency on imported technologies and improved cost-effectiveness.

**6. Key Deliverables:**

1. Prototypes of ultra-high-power supercapacitors and pulse power modules.
2. Integrated Supercapacitor Management System (SCMS) for real-time control and monitoring.
3. Testing and validation reports for performance under extreme operational conditions.
4. Manufacturing and deployment framework for scalability.

**7. Strategic Relevance:**

This project is pivotal for addressing high-power energy storage and delivery needs in critical defense systems, including directed energy weapons, railguns, and hybrid vehicles. It aligns with national goals of self-reliance, technological advancement, and the modernization of defense infrastructure. Additionally, it opens opportunities for commercial applications in renewable energy, automotive, and aerospace sectors.

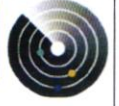
**8. Future Expectations:**

1. Enhanced Energy Solutions: The development of ultra-high-power supercapacitors and pulse power modules will provide reliable, scalable energy solutions for defense and commercial sectors, supporting high-intensity applications like directed energy weapons and electric vehicles.
2. Indigenization and Global Competitiveness: This project will reduce dependency on imports, foster self-reliance in critical energy technologies, and position India as a global leader in advanced energy storage systems, with potential for exports to allied nations.

**--End of Document--**



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### **FEASIBILITY CUM RFI RESPONSE FOR THE PROJECT REQUIREMENT UNDER TDF SCHEME (PROFORMA)**

1. **Name of the Institute** (Industry/Academia):
2. **Contact details:**
  - a. Email
  - b. PoC
  - c. Address
3. **Title of the project requirement:**
4. **Project Description** (Define broad understanding of the project requirement and proposed solution under the project).
5. **Briefly detail the proposed technical solution in terms of subsystem/submodule levels.**
6. **Road map for achieving the proposed outcome (Development Plan Phase wise -Max 5 phases).**
7. **Development and production Estimates:**
  - i. Estimated time required for development of the proposed technology /product (In Months).
  - ii. Estimated cost required for the for development of the proposed technology /product (BQs of submodules/subsystems if any pls attach).
  - iii. Estimated production cost of the end product after successful development ( per unit or batch cost).
  - iv. Whether the industry has already done any Suo moto design and development of the proposed product/technology at Technology Readiness Level – Yes/No
  - v. Details of Suo moto design and development done if marked Yes in previous question (within 250 words).
  - vi. Essential infrastructure required for development of the proposed product/technology for which funding is required.
8. **Technical strength in terms of manpower.**
9. **Relevant Work Experience.**
10. **Any other relevant information**

Queries if any and the reply in PDF FORMAT to be submitted online addressing to;

TO,

**THE DIRECTOR TDF, DRDO**

**DRDO BHAWAN, RAJAJI MARG, NEW DELHI 110011**

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