



TECHNOLOGY DEVELOPMENT FUND (TDF) SCHEME



TITLE: DEVELOPMENT OF INDIGENOUS OPTICAL TORSIONMETERS

1. **Objective:**

To design and develop and indigenize optical torsionmeters for measuring shaft torque and power through optical technology.

2. **Background:**

Presently, Torsionmeters based on strain gauge technology are being used for measuring shaft torque/power. Strain gauges operate on wheatstone bridge principle to determine strain on the shaft which is proportional to twist/torque of the shaft. However, these strain gauge based Torsion meters are prone to frequent defects in view of limited shaft life of strain gauge, delicate sensors, inaccessible locations, non-conductive environments in shaft space etc.

3. **Problem Statement:**

Usage of non-contact optical technology for shaft/torque measurement has advantages of non-contact power/signal transmission, no requirement of delicate strain gauges, robust design and easy installation/maintenance leading to a more reliable defect free system.

4. **Proposed Solution:**

The optical torque measuring system shall be mounted on propeller shaft. When the shaft is subjected to torque, this results in a small twist at the shaft surface. An LED/optical source is mounted on rotor assembly of the torsionmeter. The position/change in position in radial direction is transmitted to a detector cell/optical sensor mounted on rotor assembly. The measured values shall be transferred continuously from the rotating shaft to the stator assembly through wireless data connection.

5. **Expected Outcome:**

- I) Increased lifespan and reliability torsion meters.
- II) Reduced maintenance costs and operational downtime.
- III) Enhanced accuracy and performance consistency during extended operations.

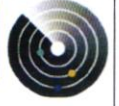
6. **Key Deliverables:**

- I) Fully functional prototypes of optical torsion meter
- II) Testing reports demonstrating performance under diverse operational scenarios
- III) Documentation of operational guidelines and integration methods.

7. **Strategic Relevance:** This project supports the indigenization of critical defense components, ensuring self-reliance, it will enhance the control on repairs. Required for measuring shaft torque/power for naval application.
8. **Future Expectation:** To design and develop indigenous optical torsionmeter for measuring shaft torque and power through optical technology.
9. **Likely Order Quantity (MoQ):** Minimum 50 units per year based on future induction plan and replacement of existing torsionmeters in in-service ships.



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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

Email to, arjunk.hqr@gov.in, CC to dir.tdf-drdo@gov.in.