



Department of Science & Technology (DST)  
Technology Development & Transfer (TDT) Division

**Project Proposal under  
Advanced Manufacturing Technology (AMT) Program**

|                        |  |
|------------------------|--|
| Project Title:         |  |
| Category               |  |
| Research Area          |  |
| Principal Investigator |  |
| Lead Institution       |  |
| Date of Submission     |  |

The Project Proposals may be submitted (1 hard copy + soft copy of proposal in PDF) between Dec.1, 2016 and Jan.15, 2017 to:  
TDT Division, Department of Science & Technology, Technology Bhawan, New Mehrauli Road, New Delhi- 110016.

Attention:

Mr. Sajid Mubashir, Scientist G (Email: [sajid@nic.in](mailto:sajid@nic.in)) or  
Dr. Krishna Kanth Pulicherla, Scientist C ([kkpulicherla.dst@gov.in](mailto:kkpulicherla.dst@gov.in))

## Research Areas:

1. Digital Manufacturing - Design tools and process innovations, modelling & simulation platforms;
2. Near net shape processing for product development
3. Flexible scale manufacturing (including die-less manufacturing; jig-less assembly; fixture-less inspection) - Additive manufacturing (AM).
4. Production scale materials processing including nano materials & surface coatings
5. Smart Manufacturing - Automation and Information & Communication Technologies (ICT); Advanced Robotics (AR) & Industrial Internet of Things (IIOT)
6. Manufacturing Technologies for wearable low power electronics including energy harvesting & sensor Networks

## Project Categories in AMT Program:

### **Level-1: Proof of Concept & Prototyping Projects (TRL 4-5)**

- R & D Projects typically to achieve Technology Readiness Levels of 4-5 (i.e., TRL-4 to TRL-5), with emphasis on innovative concepts, machine tools and new processes. Funding support of up to Rs. 50 Lakhs is envisaged.
- The project proposals can be submitted by research institutes/academia, preferably with an associated industry partner. These projects have to be accomplished within 2-year time period.

### **Level-2: Academia-Industry Consortia Projects (TRL 6-7)**

- Projects will aim to reach Technology Readiness Level of 6 to 7 (TRL-6 to TRL-7) in the above said high priority areas with specific goals defined in association with relevant industries.
- In general, this is a cost-sharing effort with industry, with the DST support extending up to 60% to 80% depending on the technology risk involved. The Consortium Projects can be about 3-4 years' duration, however they will typically target annual outcomes that are clearly demonstrable and of value.

## Technology Readiness Level (TRL) Definitions

### TRL 4 Component/subsystem validation in laboratory environment:

Standalone prototyping implementation and test. Integration of technology elements. Experiments with full-scale problems or data sets.

### TRL 5 System/subsystem/component validation in relevant environment:

Thorough testing of prototyping in representative environment. Basic technology elements integrated with reasonably realistic supporting elements. Prototyping implementations conform to target environment and interfaces.

### TRL 6 System/subsystem model or prototyping demonstration in a relevant end-to-end environment:

Prototyping implementations on full-scale realistic problems. Partially integrated with existing systems. Limited documentation available. Engineering feasibility fully demonstrated in actual system application.

### TRL 7 System prototyping demonstration in an operational environment:

System prototyping demonstration in operational environment. System is at or near scale of the operational system, with most functions available for demonstration and test. Well integrated with collateral and ancillary systems. Limited documentation available.

## Table of Contents

|   |    |
|---|----|
| DST/AMT/Application_Format_2016   |    |
| Section-1.Overview of the Project.....  | 4  |
| 1.1.Project Title:.....   | 4  |
| 1.2.Lead Investigators.....   | 4  |
| 1.3.Details of Collaborating Institutes and Industry.....                                 | 4  |
| 1.4.Please give names of 5-6 Area Experts.....  | 5  |
| Section-2.Forwarding Letters.....   | 6  |
| 2.1.Undertaking from Principal Investigator.....  | 6  |
| 2.2.Endorsement from Head of Organisation.....  | 7  |
| 2.3.Undertaking from collaborating Industries/ Agencies.....                              | 8  |
| Section-3.Relevance of Proposed Project.....  | 9  |
| 3.1.Current Status of the technology.....   | 9  |
| 3.2.Significance of the project.....  | 9  |
| Section-4.Project Work Summary.....   | 10 |
| 4.1.Detailed Objectives.....  | 10 |
| 4.2.Technical Details.....  | 10 |
| 4.3.Project Work Plan.....  | 10 |
| Section-5.Budget Summary (in ₹ lakhs).....  | 11 |
| Section-6.Itemised Budget.....  | 13 |
| 6.1.Manpower.....   | 13 |
| 6.2.Consumables.....  | 13 |
| 6.3.Contingencies.....  | 14 |
| 6.4.Other Costs (Outsourcing/ Fabrication/ Testing/ Patenting).....                       | 14 |
| 6.5.Domestic Travel – from – DST Grant (in ₹ lakhs).....                                  | 15 |
| 6.6.Equipment proposed to be procured.....  | 15 |
| 6.7.List of equipment available with participating agencies, relevant to the project..... | 15 |
| Section-7.Annexure: Justification for Itemized Budget.....                                | 16 |
| 7.1.Consumables.....  | 16 |
| 7.2.Contingency & Travel.....   | 16 |
| 7.3.Other Costs.....  | 16 |
| 7.4.Permanent Equipment.....  | 16 |
| Section-8.Biodata of Investigators.....   | 17 |
| 8.1.Principal Investigator (1):.....  | 17 |
| 8.2.Investigator (2):.....  | 17 |
| 8.3.Investigator (3):.....  | 18 |
| 8.4.Investigator (4):.....  | 18 |

## Section-1. Overview of the Project

### 1.1. Project Title:

### 1.2. Lead Investigators

#### 1.2.1. Principal Investigator (PI)

|                               |  |
|-------------------------------|--|
| Name                          |  |
| Designation                   |  |
| Agency & address              |  |
| Telephones (Mobile; Landline) |  |
| E-mail                        |  |
| Date of birth                 |  |

#### 1.2.2. Co-Principal Investigator (Co-PI)

|                               |  |
|-------------------------------|--|
| Name                          |  |
| Designation                   |  |
| Agency & address              |  |
| Telephones (Mobile; Landline) |  |
| E-mail                        |  |
| Date of birth                 |  |

### 1.3. Details of Collaborating Institutes and Industry

#### 1.3.1. Partner-1

|                  |  |
|------------------|--|
| Name             |  |
| Designation      |  |
| Agency & address |  |

|                               |  |
|-------------------------------|--|
| Telephones (Mobile; Landline) |  |
| E-mail                        |  |
| Date of birth                 |  |

### 1.3.2. Partner-2

|                               |  |
|-------------------------------|--|
| Name                          |  |
| Designation                   |  |
| Agency & address              |  |
| Telephones (Mobile; Landline) |  |
| E-mail                        |  |
| Date of birth                 |  |

### 1.4. Please give names of 5-6 Area Experts

(Please give complete postal address, telephone numbers and e-mail addresses)

1.4.1.

1.4.2.

1.4.3.

1.4.4.

1.4.5.

1.4.6.

## Section-2. Forwarding Letters

### 2.1. Undertaking from Principal Investigator

1. I have enclosed a print-copy and a soft-copy (PDF) of the Project Proposal titled: \_\_\_\_\_, complete in all respect, along with (a) Endorsement from the Head of the Organisation (on letter head), and (b) Undertakings from the Collaborating Industries/Agencies
2. I have not submitted this Project Proposal titled : \_\_\_\_\_ or similar work, elsewhere for financial support.
3. I shall ensure that if an equipment is available for use in my Organization, it will not be proposed to be purchased under the Project.

|                     |        |
|---------------------|--------|
| Name & Designation: | Date:  |
| Signature:          | Place: |
| Stamp/ Seal:        |        |

## 2.2. Endorsement from Head of Organisation

1. Name of Agency: \_\_\_\_\_
2. I, on behalf of the organization, welcome the participation of Dr/Mr/Ms \_\_\_\_\_ as the Principal Investigator (PI) and Dr/Mr/Ms \_\_\_\_\_ as the Co-PI for the Project Proposal titled: \_\_\_\_\_.
3. In the unforeseen and legitimate event of discontinuation by the PI, the Co-PI will assume full responsibility for completion of the Project. Information to this effect, endorsed by me, will be promptly sent to DST
4. The equipment and facilities (including administrative) available with the institute and those being procured under the project will be made available to the Investigator(s) throughout the duration of the Project.
5. I will ensure that the financial and purchase procedures in the project will be as per the prevailing norms, and that the Organisation shall provide timely the Statement of Expenditure and the Utilization Certificate of the Funds under the Grant as required by DST in the prescribed format.

|                     |        |
|---------------------|--------|
| Name & Designation: | Date:  |
| Signature:          | Place: |
| Stamp/ Seal:        |        |

### 2.3. Undertaking from collaborating Industries/ Agencies

1. Name of Agency: \_\_\_\_\_
2. I have gone through the Project Proposal entitled \_\_\_\_\_ submitted by Dr./Mr./Ms. \_\_\_\_\_ of \_\_\_\_\_ (Name of the Organization) for DST funding and I hereby affirm that my Organization/ Company is committed to participate in the Project to the full extent as indicated in the Project Proposal including the technical and financial commitments described in the project proposal.

|                     |        |
|---------------------|--------|
| Name & Designation: | Date:  |
| Signature:          | Place: |
| Stamp/ Seal:        |        |



## Section-3. Relevance of Proposed Project

### 3.1. Current Status of the technology

#### 3.1.1. Internationally

#### 3.1.2. Indian scenario and technological gap

#### 3.1.3. Development status at the participating agencies

### 3.2. Significance of the project

#### 3.2.1. Major applications of the proposed technology

#### 3.2.2. Target Beneficiaries & Expected Impact

#### 3.2.3. What further works will required after the project, for commercial exploitation of technology?

## Section-4. Project Work Summary

### 4.1. Detailed Objectives

#### 4.1.1. Specific Objectives

#### 4.1.2. Scientific Basis and Methodology

### 4.2. Technical Details

#### 4.2.1. Targeted level of development under the project

(Describe the Prototypes/ Process Demonstration; preferably with reference to Technology Readiness Levels)

#### 4.2.2. Proposed target specifications & performance standards

#### 4.2.3. Innovative Elements/Components of the Project

### 4.3. Project Work Plan

- a) Milestones with Dates, Work Elements & Organization responsible for it
- b) Schedules/ Work-Packages

## Section-5. Budget Summary (in ₹ lakhs)

|    | Item                | 1 <sup>st</sup> Year |          | 2 <sup>nd</sup> Year |          | 3 <sup>rd</sup> Year |          | Total |          |
|----|---------------------|----------------------|----------|----------------------|----------|----------------------|----------|-------|----------|
|    |                     | DST                  | Partners | DST                  | Partners | DST                  | Partners | DST   | Partners |
| 1. | Manpower            |                      |          |                      |          |                      |          |       |          |
| 2. | Consumables         |                      |          |                      |          |                      |          |       |          |
| 3. | Contingency         |                      |          |                      |          |                      |          |       |          |
| 4. | Other Costs*        |                      |          |                      |          |                      |          |       |          |
| 5. | Travel              |                      |          |                      |          |                      |          |       |          |
| 6  | Permanent Equipment |                      |          |                      |          |                      |          |       |          |
| 7  | Overhead Charges    |                      |          |                      |          |                      |          |       |          |
|    | Total               |                      |          |                      |          |                      |          |       |          |

(\*Outsourced work, Fabrication & Testing)

Total Project Budget = ₹            lakhs,  
 Request for DST Grant= ₹            lakhs,  
 Partners Contributions= ₹            lakhs,

Research Manpower to be engaged in the project:

|                        |                        |                         |                          |                           |
|------------------------|------------------------|-------------------------|--------------------------|---------------------------|
| JRF<br>(₹ 25,000 +HRA) | SRF<br>(₹ 28,000 +HRA) | RA-I<br>(₹ 36,000 +HRA) | RA-II<br>(₹ 38,000 +HRA) | RA-III<br>(₹ 40,000 +HRA) |
|                        |                        |                         |                          |                           |

### **Norms for Manpower, Travel, Contingency & Overheads**

#### **Manpower**

| <b>Nomenclature &amp; Emoluments</b>        | <b>Qualification</b>   |
|---|--|
| Junior Research Fellow<br>(₹25,000/- + HRA) | Post Graduate Degree in Basic Science with NET qualification or Graduate Degree in Professional course with NET qualification or Post Graduate Degree in Professional Course   |
| Senior Research Fellow<br>(₹28,000/- + HRA) | Qualification prescribed for JRF with two years of research experience   |
| Research Associate-I<br>(₹36,000/- + HRA)   | Ph.D/ MD/ MS/ MDS or equivalent degree or having 3 years of research, teaching and design and development experience after MVSc/ M.Pharm/ ME/ M.Tech with at least one research paper in Science Citation Indexed (SCI) journal.<br>The Research Associate Scale may be decided by the institute/ organization based on the experience of the candidate. |
| Research Associate-II<br>(₹38,000/- + HRA)  |  |
| Research Associate-III<br>(₹40,000/- + HRA) |  |

## Travel & Contingency

₹50,000/- each per annum will be provided for Travel and Contingencies. Higher amount, based on the recommendations of the Expert Committee, to be provided where the research work involves field work or/and project has many investigators/institutions and larger manpower. The contingency amount may also be used for paying Registration Fees for attending international conferences.

## Overheads

Overhead amount is towards meeting the cost of academic expenses including infrastructural facilities at the host institutes, and is permissible as given below: :

- a) For projects costing upto ₹1 crore, 10% of the total cost for educational institutions and NGOs and 8% for laboratories and institutions under Central Government Departments/Agencies;
- b) For projects costing more than ₹1 crore and upto ₹5 crore, overheads of ₹15 lakh or 10% of total cost whichever is less;
- c) For projects costing more than ₹5 crore and upto ₹20 crore, ₹20 lakh will be provided as overheads; and
- d) For projects costing more than ₹20 crore, the quantum will be decided on a case to case basis.

## Section-6. Itemised Budget

### 6.1. Manpower

#### 6.1.1. Budget for Salaries - DST Grant

| Designation | Qualification | Salary per month | Number of Persons | Amount<br>(in ₹ lakhs) | Role<br>Description |
|-------------|---------------|------------------|-------------------|------------------------|---------------------|
|             |               |                  |                   |                        |                     |
|             |               |                  |                   |                        |                     |
|             |               |                  |                   | ₹ lakhs                |                     |

#### 6.1.2. Budget for Salaries - Partner Contribution

| Designation | Qualification | Salary per month | Number of Persons | Amount<br>(in ₹ lakhs) | Justification |
|-------------|---------------|------------------|-------------------|------------------------|---------------|
|             |               |                  |                   |                        |               |
|             |               |                  |                   |                        |               |
|             |               |                  |                   | ₹ lakhs                |               |

### 6.2. Consumables

Please provide the quantified list of consumables along with cost estimates/quotations in the Annexure  
(Item, Quantity & Unit cost)

#### 6.2.1. Budget for Consumable Materials - DST Grant (in ₹ lakhs)

| 1st Year | 2nd Year | 3rd Year | Total |
|----------|----------|----------|-------|
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |

#### 6.2.2. Budget for Consumable Materials (Partners Contribution ) (in ₹ lakhs)

| 1st Year | 2nd Year | 3rd Year | Total |
|----------|----------|----------|-------|
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |

### 6.3. Contingencies

Please provide the basis of cost estimates in the Annexure.

#### 6.3.1. Budget for Contingencies- DST Grant (in ₹ lakhs)

| 1st Year | 2nd Year | 3rd Year | Total |
|----------|----------|----------|-------|
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |

#### 6.3.2. Budget for Contingencies (Partners Contribution) (in ₹ lakhs)

| 1st Year | 2nd Year | 3rd Year | Total |
|----------|----------|----------|-------|
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |

### 6.4. Other Costs (Outsourcing/ Fabrication/ Testing/ Patenting)

Please provide the basis of cost estimates/quotations in the Annexure.

#### 6.4.1. Budget for Other Costs-DST Grant (in ₹ lakhs)

| Item        | 1st Year | 2nd Year | 3rd Year | Total |
|-------------|----------|----------|----------|-------|
| Outsourcing | ₹        | ₹        | ₹        | ₹     |
| Fabrication | ₹        | ₹        | ₹        | ₹     |
| Testing     | ₹        | ₹        | ₹        | ₹     |
| Others      | ₹        | ₹        | ₹        | ₹     |

#### 6.4.2. Budget for Other costs- Partners Contribution (in ₹ lakhs)

| Item        | 1st Year | 2nd Year | 3rd Year | Total |
|-------------|----------|----------|----------|-------|
| Outsourcing | ₹        | ₹        | ₹        | ₹     |
| Fabrication | ₹        | ₹        | ₹        | ₹     |
| Testing     | ₹        | ₹        | ₹        | ₹     |
| Others      | ₹        | ₹        | ₹        | ₹     |

### 6.5. Domestic Travel – from – DST Grant (in ₹ lakhs)

Please provide the basis of cost estimates in the Annexure. (journeys, purpose)

| 1st Year | 2nd Year | 3rd Year | Total |
|----------|----------|----------|-------|
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |
| ₹        | ₹        | ₹        | ₹     |

### 6.6. Equipment proposed to be procured

Please provide justification in Annexure on the use of equipment in project. Provide supporting Quotation

#### 6.6.1. Budget for Permanent Equipment – DST Grant

| Description of Equipment | Foreign/<br>Indigenous | Unit Landed Cost<br>(CIF, Custom Duty<br>etc.) | Number<br>of Items | Total<br>(in ₹ lakhs) |
|--------------------------|------------------------|--|--------------------|-----------------------|
|                          |                        | ₹  |                    | ₹                     |
|                          |                        | ₹  |                    | ₹                     |
|                          |                        | ₹  |                    | ₹                     |

#### 6.6.2. Budget for Permanent Equipment - Partner Contribution

| Description of Equipment | Foreign/<br>Indigenous | Unit Landed Cost<br>(CIF, Custom Duty<br>etc.) | Number<br>of Items | Total<br>(in ₹ lakhs) |
|--------------------------|------------------------|--|--------------------|-----------------------|
|                          |                        | ₹  |                    | ₹                     |
|                          |                        | ₹  |                    | ₹                     |
|                          |                        | ₹  |                    | ₹                     |

### 6.7. List of equipment available with participating agencies, relevant to the project

| Description of Equipment | Foreign/<br>Indigenous | Agency where it is located |
|--------------------------|------------------------|----------------------------|
|                          |                        |                            |
|                          |                        |                            |
|                          |                        |                            |

## **Section-7.     Annexure: Justification for Itemized Budget**

Please provide justification against each sub-heading below, along with supporting Quotation.

### **7.1.   Consumables**

### **7.2.   Contingency & Travel**

### **7.3.   Other Costs**

### **7.4.   Permanent Equipment**



## Section-8. Biodata of Investigators

### 8.1. Principal Investigator (1):

8.1.1. Name, Designation, Agency:

8.1.2. Gender & Date of Birth:

8.1.3. Qualifications:

8.1.4. Employment Experience (Last 10 years):

8.1.5. Publications (Last 5 years):

8.1.6. Patents:

8.1.7. Research Thesis Guided:

### 8.2. Investigator (2):

8.2.1. Name, Designation, Agency:

8.2.2. Gender & Date of Birth:

8.2.3. Qualifications:

8.2.4. Employment Experience (Last 10 years):

8.2.5. Publications (Last 5 years):

8.2.6. Patents:

8.2.7. Research Thesis Guided:

8.3. Investigator (3):

8.3.1. Name, Designation, Agency:

8.3.2. Gender & Date of Birth:

8.3.3. Qualifications:

8.3.4. Employment Experience (Last 10 years):

8.3.5. Publications (Last 5 years):

8.3.6. Patents:

8.3.7. Research Thesis Guided:

8.4. Investigator (4):

8.4.1. Name, Designation, Agency:

8.4.2. Gender & Date of Birth:

8.4.3. Qualifications:

8.4.4. Employment Experience (Last 10 years):

8.4.5. Publications (Last 5 years):

8.4.6. Patents:

8.4.7. Research Thesis Guided: