

**INVITATION FOR EXPRESSION OF INTEREST FOR PROCUREMENT OF  
1966 ROUNDS OF 155 MM TERMINALLY GUIDED MUNITION (TGM)  
UNDER MAKE II CATEGORY OF DAP-2020**

**References** : Defence Acquisition Procedure - 2020.

**Appendices** :

**Appendix A** : Preliminary Service Qualitative Requirements

**Appendix B** : Commercial Evaluation Criteria.

**Appendix C** : Technical Evaluation Criteria.

**Appendix D** : Correctness Certificate.

**Appendix E** : Confidentiality Agreement.

**Appendix F** : EoI Compliance Certificate.

**Appendix G** : Information Performa

1. **Introduction**. 155 mm Terminally Guided Munition (TGM) enables the capability enhancement of Artillery guns by allowing precision strikes and simultaneously reducing collateral damage. At present there is no Terminally Guided Munition held in the inventory of Regiment of Artillery. Therefore, the ammunition is proposed to be acquired under Make-II, wherein, it is desired to be a low cost option. Moreover, with indigenous development, the dependency on a foreign vendor is obviated and with close integration between the developer and services, the development is likely to be more suited to requirements of the Artillery. The requirement of this ammunition will increase manifold as majority of the Artillery Regiments will convert of 155 mm calibre as per the upgradation of the Indian Artillery. Thus, sustenance of the industry will be ensured due to continuous demand.

2. **Objective** The objective of this invitation of Expression of Interest (EoI) is to seek willingness of Indian Vendors to participate in the Make II Project for procurement of 1,966 complete rounds of 155 mm Terminally Guided Munitions (TGM) with support equipment under Make II category of DAP-2020. Indian Vendors meeting the Technical, Commercial and Project Requirements laid out in the EoI will be issued a 'Project Sanction Order' to develop a prototype as per provisions of DAP-2020.

3. **Layout** The EoI has been covered under following parts:-

(a) Part I : General Information.

(b) Part II : Scope of the Project.

- (c) Part III : Evaluation Criteria.
- (d) Part IV : Procedure for submission of response to the EoI.
- (e) Part V : Miscellaneous.

4. The nodal officer for this project for all queries/ clarifications/ coordination will be **Secretary, Project Facilitation Team (PFT), 155 mm Terminally Guided Munitions (TGM) Project**. Address and contact details of the nodal officer are given at **Paragraph 31 of the EoI**.

### **PART I : GENERAL INFORMATION**

5. **Nomenclature.** 155 mm Terminally Guided Munition (TGM).
6. **Categorisation.** 'In accordance with **Para 5 of Chapter III of DAP-2020**.The project shall be further categorised as under :-
- (a) **Prototype Development Phase.** '**Make-II(Industry Funded)**', in accordance with Para 5 (b) (i) of Chapter-III of DAP-2020.
- (b) **Procurement Phase.** **Buy Indian (IDDM)** with min 50% IC, in accordance with Para 6 (d) of Chapter-III of DAP-2020'.
7. **Quantities.** The quantities sought for the project are:-
- (a) **Prototype Development Stage.** 25 rounds of 155 mm Terminally Guided Munition (TGM) along with four Fire Control Systems.
- (b) **Procurement Stage.** 1,966 rounds of 155 mm Terminally Guided Munitions (TGM) with support equipment as under:-

<b>Serial No</b>	<b>Items</b>	<b>Quantity</b>	<b>Delivery Schedule</b>
(aa)	155 mm TGM Projectile	1,966	197 TGM/Year for 10 years
(ab)	Fire Control System	170	Contract+12 Months
(ac)	Projectile Simulator	87	
(ad)	Sectionised Projectile	87	

8. **Make-II Procedure.** Make-II Procedure is available at Chapter III of DAP-2020.
9. **Appreciated Timelines.** Tentative timelines for the project are as given at **Serial 13**.

## PART II : SCOPE OF THE PROJECT

### 155 mm Terminally Guided Munition (TGM)

10. **Scope.** 1,966 complete rounds of 155 mm Terminally Guided Munition (TGM) is conceived as an inescapable requirement for 155 mm Gun Regiments and will be developed by the Indian Industry. This project is aimed at meeting this requirement indigenously.

11. **Preliminary Services Qualitative Requirements (PSQR) of the Proposed System.** PSQR (aligned to DAP-2020) of 155 mm Terminally Guided Munition (TGM) is attached as **Appendix A.**

### Time Line And Milestones

12. Stages of development and procurement are as per Chapter III of DAP-2020.

13. **Time Lines & Milestones.**

<u>Ser No</u>	<u>Activity</u>	<u>Remarks</u>	<u>Timelines (from AoN)</u>
<b><u>PHASE-I</u></b>			
(a)	Issue of Eol	By Project Facilitation Team (PFT)	To
(b)	Eol Responses Submission	By Eol respondents (Indian Vendors)	To+8 weeks
(c)	Eol Responses Evaluation	By Project Facilitation Team (PFT)	To+14 weeks
(d)	Short listing of DAs and Issue of Project Sanction Order for Development of Prototype	To selected DAs, those meeting evaluation criteria	To+16 weeks
<b>Total Timeline for Phase-I</b>			<b>16 weeks</b>
<b><u>PHASE-II (Prototype Development &amp; Evaluation)</u></b>			
(e)	<b><u>Design &amp; Devp of Prototype and UTRR.</u></b> Confirm completion of Design & Development as per UTRR prior to commencement of User Trials.	More than one review may be conducted on requirement basis. Dates to be promulgated by PFT, as per the progress of the project.	48 weeks To+64 weeks
(f)	Conversion of PSQRs to SQRs	-	4 weeks To+68 weeks
(g)	Solicitation of Commercial Offer - Commercial RFP will be issued for submission of Commercial Offers prior to commencement of User Trials.	To validate the performance of the system against the specifications of approved GSQRs after the development of prototype.	4 weeks To+72 weeks
(h)	<b>Phase-III (FET till contract) - As per Chapter II of DAP 2020</b>		

## **Development of Prototype and Trials**

14. All possible and reasonable assistance and any clarification related to functional or operational aspect of development as sought by DAs will be provided by Project Facilitation Team (PFT).

15. After the prototype has been developed as per PSQR given at **Appendix 'A'**, the PFT would carry out User Trial Readiness Review of the prototype(s) and freeze the Technical Specifications before conduct of User Trials on NCNC basis. Evaluation of the equipment will be carried out during the Trials to validate the performance of the equipment against the Final Technical Specifications. **Service HQ will formulate the 'Trial Directive' which will incorporate the parameters for validating the 'Essential Parameters'**. Necessary technical literature pertaining to the design & material will be provided by the DAs for the User Trial Readiness Review and conduct of User Trials on the prototype.

## **Solicitation of Commercial Offers**

16. A commercial Request for Proposal (RFP) for 'Buy (Indian-IDD)' phase would be issued to DA(s) prior to commencement of User Trials for soliciting their commercial offers. **Additional technical information/ documentation, as may be necessary including those related to Indigenous Content and IPRs would also be required to be provided by the vendor prior to the issue of Commercial RFP.**

## **Deliverable**

17. The project is envisaged to have the following deliverables:-

- (a) **Prototype Development Stage.** 25 rounds of 155 mm Terminally Guided Munition (TGM) along with four Fire Control Systems and accessories (if any).
- (b) **Procurement Stage.** 1,966 rounds of 155 mm Terminally Guided Munition (TGM) with support equipment as under:-

<b>Serial No</b>	<b>Items</b>	<b>Quantity</b>	<b>Delivery Schedule</b>
(i)	155 mm TGM Projectile	1,966	197 TGM/Year for 10 years
(ii)	Fire Control System	170	Contract+12 Months
(iii)	Projectile Simulator	87	
(iv)	Sectionised Projectile	87	

- (c) Training and Technical literature to include User Hand Book, Preservation Instructions, Complete Equipment Schedule and Technical Manuals. These will be provided with the equipment during the procurement phase. Details will be further amplified in the Request for Proposal (RFP).

## Details of Trials

18. The following trials will be conducted / assistance will be provided:-

(a) **Trials**. The trials will be conducted in two stages:-

(i) **Stage-I: User Trials Readiness Review (UTRR)**. Development of prototype and bring the 155 mm Terminally Guided Munitions (TGM) complete rounds and support equipment to user trial level. PFT will carry out UTRR of prototype and freezing of Technical Specification as per policy in vogue. In case more than one review is required, the same may be conducted on requirement basis for which the timelines will be promulgated by the PFT.

(ii) **Stage-II: Field Evaluation Trials**. To evaluate the performance and assess the suitability of 155 mm Terminally Guided Munition (TGM) complete rounds and support equipment to meet operational, technical and safety aspects, **User Trials, DGQA Trials, EMI / EMC Trials and Maintainability Evaluation Trials (MET)** on **NCNC basis** will be conducted. Details of the same will be included in the RFP.

(b) **Assistance to be Provided**. 155mm/ 39 /45/ 52 Caliber guns will be provided for firing during trials. In addition, assistance to the Development Agencies in terms of provision of allotment of ranges, testing facilities and access to service equipment will be guided by **Govt of India, Ministry of Defence letter No18(2)/15/GTF/DP(Plg-MS) dated 28 August 2019**. In case any damage occurring to **equipment/ property/ personnel resulting from the testing of the job of private entity, the private entity is liable to bear the expenses** of repair/replacement of the facility and all necessary insurance coverage for the job shall be the responsibility of the private entity.

## Multiple Technological Solutions

19. 155 mm Terminally Guided Munitions (TGM) are planned to be utilised with 155 mm Gun Units, best available solution using more than one technique for guidance with minimum human interference will be accepted. Post conclusion of FET, if different technique for guidance is being offered by FET qualified vendors then the order may be split between L1 and L2 vendor in 60:40 ratio on the condition that the second (L2) vendor accepts the price and terms & conditions quoted by the L1 vendor. In case L2 vendor refuses to meet the price or the terms and conditions of L1 vendor, either the L3 vendor (with different technique of guidance than L1) could be offered the same option to match L1 price and terms/conditions, or the entire order could be placed on L1 vendor.

## Intellectual Property Rights (IPRs)

20. As per provisions of **Para 59, Chapter III of DAP-2020**. Further, based on the development of the prototype, a comprehensive list of design documents (to be informed subsequently) will need to be submitted by the development agencies for verification by a Committee of Experts.

### **PART III : EVALUATION CRITERIA**

#### **Commercial Evaluation Criteria**

21. Eol respondents will furnish their response to the Commercial Evaluation Criteria as per **Appendix B**.

#### **Technical Evaluation Compliance Matrix**

22. The respondents to this Eol are required to furnish information and compliance/ information as per **Appendix C** against PSQR of the equipment.

23. **Indigenous Content.**

(a) **Prototype Development Stage.** Minimum 50% Indigenous Content with indigenous design and development.

(b) **Procurement Phase.** Post successful development of prototype(s), further procurement will be as per the 'Buy (Indian-IDDMM)' procedure with a minimum of 50% Indigenous Content in accordance with Para 21 of Chapter I of DAP 2020 and as per the policy of MoD in vogue.

24. **Additional Information.** Additional information required to be furnished as part of the Eol response is given at **Appendix G**.

25. **Foreign Collaboration.** If the DA is collaborating/ plans to collaborate with a foreign technology provider, the nature of such collaboration and the technology areas being transferred must be stated in the response.

### **PART IV : PROCEDURE FOR SUBMISSION OF RESPONSE TO THE Eol**

26. The response to the Eol shall be submitted as per formats given at **Appendix B to Appendix G**.

27. **Guidelines for Submitting Eol Responses.**

(a) The responses should be submitted strictly as per the formats given in respective Appendices. Should a vendor need to mention any other information, a separate column / row may be added. Vendors should provide compliance or non-compliance to parameters and no conditional response/ compliance shall be submitted by the firm/ vendors.

(b) All responses and Appendices should be submitted in a single file / folder. Supporting documents / additional references should be submitted in a separate folder with proper reference mentioned against each parameter / sub parameter in respective appendices.

(c) Any supporting document / evidence without any reference to specific parameter of criteria will not form part of the assessment.

28. **Rejection Criteria for Selection as DAs.** The following may lead to rejection of Eol response :-

- (a) Failure to meet Commercial Evaluation Criteria given at **Appendix B**.
- (b) Failure to meet/ comply with the Technical Evaluation Criteria Specifications give at **Appendix C**.
- (c) Failure to offer compliance to any of the terms and conditions given in the Eol.
- (d) Failure to submit certificate as mentioned at **Appendix D to G** of the Eol.
- (d) Any other parameter of the response considered inadequate by the MoD, Government of India.

29. **Foreclosure Criteria.** As per provisions of Para 20, Chapter III of DAP-2020, no government funding is envisaged for prototype development, but there is an assurance of orders on successful development and trials of prototype. No foreclosure of the project will be done after issue of Project Sanction Order other than for reasons of default / non-adherence to Project Sanction Order by vendors or delay by DA to produce the prototype for trials.

30. The Eol respondent shall submit three (03) copies of response to the Eol, clearly marking one copy as '**Original Copy**' and second & third as '**Duplicate Copy and Triplicate Copy**'. In the event of any discrepancy between them, the original copy shall govern/ prevail. Each page of the response will bear the signatures of the authorised signatory of the company. The DA shall also submit a soft copy of the response to this Eol in a CD/ DVD.

31. **The Envelops shall be Addressed as under:-**

Secretary, Project Facilitation Team  
 Arty-5 (Plans & New Eqpt),  
 Directorate General of Artillery, Integrated HQ of MoD (Army)  
 Room No 507, 'A' Wing, Sena Bhawan  
 DHQ PO, New Delhi – 110011  
 email id – aproc@nic.in  
 Tele No – 33609

32. The responses to this Eol must be submitted by **28 Jan 2022** at the above mentioned address.

33. The Company will be required to sign and honour the 'Confidentiality Agreement' with MoD Govt of India. The 'Confidentiality Agreement' will be furnished by each Eol respondent at the time of submission of Eol responses as per format given at **Appendix E**.

**PART V : MISCELLANEOUS**

34. **Pre Eol Responses Meeting** A pre-response meeting will be held on **16 Dec 2021** at 1100Hr at Directorate General of Artillery, Arty-5 (Plans & New Eqpt), New Delhi-11011. Vendors are required to submit their queries / clarifications / amplifications in writing to this office by **09 Dec 2021**.
35. Guidelines for penalties in business dealings with entities as promulgated by Government from time to time, will be applicable on procurement process & bidders.
36. The Pre-Contract Integrity Pact (PCIP), listed as detailed in Paragraph 92 of Chapter II of DAP-2020, shall apply mutatis mutandis to the 'Buy (Indian-IDDM)' phase of 'Make' project.
37. Respondent would be subject to disqualifications if they make false, incorrect, or misleading claims in their response to this Eol. A 'Correctness Certificate' As per the format at **Appendix D** will be furnished as part of the response.
38. An Eol Compliance Certificate will be submitted as per **Appendix F**.
39. Please acknowledge the receipt of this invitation for Eol.

File No :A/75471/Make/TGM/GS/Arty-5

Dated : 01 Dec 2021

Sdx-x-x-x-x-x  
(**Devendra Upadhyay**)  
Colonel  
Secy  
Project Facilitation Team  
Directorate General of Artillery  
Arty-5 (Plans & New Eqpt),

Enclosures: **Appendices A to G**



**PRELIMINARY STAFF QUALITATIVE REQUIREMENT (PSQR) FOR  
155 MM TERMINALLY GUIDED MUNITIONS (TGM)**

1.	Reference to General Staff Policy Statement No	:	352
2.	PSQR No (To be allotted by the General Staff)	:	81
3.	Other Previous GSQR No.	:	-
4.	Next review due on	:	-
5.	GSQR being superseded	:	NA
6.	Reference GSEPC Meeting	:	04 Jun 2020
7.	Line Directorate File No.	:	A/75471/Make/TGM/ GS/Arty-5
8.	Nomenclature	:	155mm Terminally Guided Munition (TGM)
9.	Security Classification	:	Restricted
10.	Priority for Development	:	High Priority
11.	GSQR Reviewed / Modified On	:	NA
12.	Next Review Due	:	NA
13.	GSQR being Superseded	:	NA

**Introduction & Proposed Service Employment**

14. Terminally Guided Munitions enable capability enhancement of Artillery guns by enabling precision strikes and simultaneously reducing collateral damage. At present there is no indigenous TGM held in the inventory of the Regiment of Artillery.

15. As a Make-II case, it is desired to be a low cost option, and with industrial base within the country, the likelihood of break in the supply chain is not visualised. Moreover, with indigenous development, the dependency on a foreign vendor is obviated and with close integration between the developer and services, the development is likely to be more suited to requirements of the Artillery. The requirement of this ammunition will increase manifold as majority of the Artillery Regiments will convert to 155mm calibre as per the mediumisation plan of the Indian Artillery. Thus, sustenance of the industry will be ensured due to continuous demand.

16. **Proposed Service Employment.** The proposed 155mm TGM will be used for precision targeting.
17. **Scaling.** The ammunition will be scaled as per the authority on the subject - PC to MEA/16208/GS/Arty-4(D)(O-1) dated 12 August 2008), attached as **Appendix A:-**
- (a) **1<sup>st</sup> Line.** 1.5 rounds.
  - (b) **2<sup>nd</sup> Line.** 0.75 rounds.
18. **Carriage.** It will be carried in the service transport (both first and second line transport).

### **ESSENTIAL PARAMETERS 'A'**

#### **Operational Parameters**

19. The ammunition should be capable of being guided to the target by changing its designated course from its ballistic trajectory either by continuous guidance through GPS/GLONASS/IRNSS with INS or by designation of the target from a ground based Observation Post Officer/Air Observation Post Officer from a helicopter/ remotely controlled Unmanned Aerial Vehicle (UAV). The ammunition should be provided with fins and canards that facilitate necessary corrections to ballistic flight path and allow the it to move on a non-ballistic trajectory to reach the target. In case, when target is designated, the designator, should be capable of being operated from a static or a mobile platform, from ground or from aerial platform. The ammunition should be passive in nature and should only receive signals. It should not radiate Electro-Magnetic Waves and should therefore, be resistant to jamming.

#### 20. **Physical Characteristics.**

- (a) **Weight.** Weight of the shell should not be more than 52 kgs.
- (b) **Dimensions.** The dimensions should be such that the shell can be fired with all in-service 155mm/39/45/52 Calibre gun systems without any modifications.

#### 21. **Design.**

- (a) The ammunition should be capable of sustaining firing stresses generated by all 155mm/39/45/52 Calibre guns whether In-Service or under induction or under planned induction.
- (b) Design of the shell should be STANAG compliant as per internationally acceptable standards.
- (c) Shell design should be such that its natural frequencies do not match the frequencies generated by the charge system (whether Modular or Bag Charge). Thus, the resonance frequency of the shell should be well beyond the natural frequencies of the charge system.

(d) The ammunition should be capable of being fired with highest charges using the in-service charges.

22. **Compatibility.**

(a) **Calibre.** The ammunition should be compatible with all In-Service 155mm guns of 39/45/52 calibre gun systems.

(b) **Charge System.** The ammunition system should be capable of being fired with the In-Service BMCS or Bag Charges both indigenous or ex import.

(c) **Loading System.** The ammunition should be compatible to the loading mechanism of the gun systems that are In-Service.

(d) **Satellite System.** The ammunition should be capable of receiving signals from GPS/GLONASS/IRNSS satellite systems.

23. **Range.**

(a) **Maximum Range.** The ammunition should be capable of achieving precision at 85% of maximum ranges using both Bag Charges and Modular Charges.

(b) **Minimum Range.** The ammunition should be capable of being fired at the minimum ranges as achieved by in-service 39/45/52 calibre guns using Bag Charges and Modular Charges.

24. **Angle of Fire.** The ammunition should be capable of being fired at both Low and High Angles of Fire.

25. **Angle of Approach to the Target.** Guidance system of the ammunition must allow it to change its ballistic trajectory and approach target at near vertical angle of minimum 80°.

26. **Accuracy.** 10 meters CEP at both High and Low Angle of fire.

27. **Circular Error of Probability (CEP).** CEP of the ammunition should be less than 10 meters for all ranges while being guided in any terrain, ie plains, semi deserts, deserts, mountains and High Altitude Areas(HAA).

28. **Base Bleed.** Contingent to the maximum range already specified at Para 8.

29. **Safety.**

(a) **While Firing.** It should be robust enough to sustain pressures in the chamber and in the barrel when fired with highest charges (both Modular and Bag Charges) in a 155mm/39/45/52 calibre gun.

(b) **During Flight.** It should have safety mechanisms that ensure safety during flight.

(c) **Incremental Safety.** The safety mechanisms should be incremental in nature, in a manner that failure at any one level should not allow arming of the ammunition.

(d) **During Handling and Transportation.** The ammunition should be safe during transportation by rail, road and air and while handling. No additional preparations/precautions should be needed.

(e) **Air Transportation and Air Dropping.** It should be safe during air transportation and must be '***Fit for Air Drop***'. Adequate markings should be evidently seen during day and at night for "Fit for Air Drop" and adequate tests must be carried out prior to this certification in accordance to parameters laid down in STEC (Storage & Transportation of Explosives Committee) pamphlet.

### **Technical Parameters.**

30. **Guidance System.** Primary mode of Guidance will be through GPS/ IRNSS/GLONASS. Secondary mode of guidance in addition to the primary mode may be through MMW/LASER/IR.

(a) **Primary Mode of Guidance through GPS/ IRNSS/GLONASS.** The ammunition should be capable of being guided by jam resistant internal GPS/IRNSS/GLONASS receiver. The guidance system should be roll stabilised for continued guidance. The system should be provided with an Inertial Navigation System/Unit (INS/INU) for continued and improved guidance to cater for GPS deprived environment.

(b) **Secondary Mode of Guidance through MMW/LASER/IR.** In addition to the Primary Mode, guidance may be provided using MMW/LASER/IR, wherein the designator will also be provided along with the ammunition system. The ammunition in this case, will be guided by GPS/IRNSS/GLONASS during its flight and will be terminally guided to further improve precision.

31. **Mission Planning Equipment.**

(a) **GPS guidance.** The system should be provided with a Military Grade robust and electronically hardened standalone Mission Planning Equipment to feed the mission data in the ammunition. The system should also be provided with a handheld device to provide accurate position location to the Observation Post Officer for accurate target acquisition.

(b) **MMW/LASER/IR Guidance.** The system should be provided with a Designation System, capable of illuminating the target, which can operate either from a ground based Observation Post Officer/Air Observation Post Officer from a helicopter/remotely controlled Unmanned Aerial Vehicle (UAV). The ammunition should be capable of receiving these target illuminating signals and then home onto the target.

32. **Electronic Counter Measures (ECM) and Electronic Counter Measures (ECCM).** The ammunition should be resistant to jamming. It should have inbuilt ECCM features. It should also be provided with ECM features which could enable it jam radio frequency generating devices along its trajectory.

33. **Multi-Modal Fuze.** It should be provided with Point Detonation function, Proximity function and Delay function (to enable penetration upto 8 inches of reinforced concrete).

34. **Power Supply.** The fuze should be powered by super capacitors actuated by firing of the ammunition for providing power supply to the electronics.

### **Maintenance and Ergonomic Parameters**

35. **Terrain & Climatic Conditions.** It should be capable of functioning in all weather conditions as obtained in the Indian Subcontinent (in plains, deserts, semi-deserts, mountains and High Altitude Areas) as per DG MO letter No A/90220/OP TEMP/MO-9 dated 07 December 2012 and within temperature ranges as under:-

(a) Evaluation Temperature - As per JS 55555 for electronic (latest) components and as per JSG 0102 for the armament.

(b) Operational Temperature - (-)20°C to (+)45°C (**Appendix B**)

36. **Durability and Service Life.** It should be capable of being fired with all in-service 155mm/39/45/52 Calibre guns in high and low angles of fire and should be able to sustain the pressures generated in each calibre with the highest charges. Minimum expected shelf life of all components of the projectile is 20 years without any repairs.

37. **Preservation During Use and Storage.** The ammunition should be suitable to be stored and used under field conditions. Storage conditions are as under:-

Ser	Storage	Temperature		Shelf Life	Remarks
(a)	Controlled	-17°C	+37°C.	20 yrs	Humidity indicator is mandatory on projectile
(b)	Uncontrolled	-53°C	+71°C.	02 yrs	

38. **Suitability to Environmental Conditions.** It should be compliant to JS55555, Mil Std 810-F, JSG 0102 and IS Specification 10236 series, as applicable.

39. **Reliability.** Reliability of functioning of the ammunition should not be less than 95% in all environmental conditions as obtained in the Indian Subcontinent. Fog, rain, snow, dust/sand & obscurants should not affect GPS or terminal guidance mechanisms.

40. **Environmental Requirements.** The ammunition should be capable of storage and performance in all terrain, climatic conditions as obtained in the Indian Subcontinent and in compliance with the temperature ranges given in JS 55555, Mil Std 810-F, JSG 0102 and IS Specification 10236 series, as applicable.

41. **Manufacturing Process.** The manufacturing process must be suited for mass production with minimum defects. It should follow the best practices as per ISO/IEC quality standards or any equivalent quality standards or better standards.

42. **Shelf Life.** Minimum Shelf Life of the ammunition should be 20 years.

43. **Packing/Marking.** The ammunition should be hermetically sealed in weatherproof containers and have the standard markings as per the in service ammunition.

**ESSENTIAL PARAMETERS 'B'**

44. Nil.

**DESIRABLE PARAMETERS**

45. Nil.

46. **Review of PSQR.** The PSQR will be reviewed on as required basis and converted/frozen to GSQR prior to issue of RFP.

**COMMERCIAL EVALUATION CRITERIA**

**Commercial Evaluation Criteria**

1. Name of the Vendor.
2. Evaluation Criteria

<b><u>Ser No</u></b>	<b><u>Criteria</u></b>	<b><u>Vendor Submission</u></b>	<b><u>Remarks (if Any)</u></b>
(a)	Nature of the Company (refer Para 6(b) of Chapter III of DAP-2020)	Indian / Joint Venture	
(b)	Ownership status (refer Para 6(b) of Chapter III of DAP-2020)	Compliant / Non compliant	
(c)	Category of Industry	Large / Medium / Small / Micro / OFB / Start Up	
(d)	Registration Details	Yes / No	
(e)	<b><u>Minimum average turnover for last three financial years from date of issue of Eol.</u></b> Min Avg Annual Turnover for last 03 financial years, ending 31 <sup>st</sup> March of the previous financial year, should not be less than 62 Cr.	Compliant / Non compliant	
(f)	<b><u>Net worth of previous financial year ending 31 Mar 2021.</u></b> Net worth of entities, ending 31 <sup>st</sup> Mar of the previous financial year, should be "Positive".	Compliant / Non compliant	
(g)	DIPP License details.		

Date :

**Note :**

1. All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not assessed.

**Appendix C**  
(Refer Para 22 of EoI)

**TECHNICAL EVALUATION CRITERIA**

<b><u>Ser No</u></b>	<b><u>Criteria and Sub Criteria</u></b>	<b><u>Vendor Response</u></b>	<b><u>Remarks (if Any)</u></b>
1.	Indigenous content will be minimum 50% as per DAP-2020	Compliant/ Non Compliant	
2.	Indigenous design as per provision of DAP-2020	Compliant/ Non Compliant	
3.	<b><u>Timelines</u></b>		
	(a) Development of prototype 48 weeks including UTTR	Compliant/ Non Compliant	
	(b) Delivery of items as per delivery schedule 197 Rounds/ year for next ten years with 197 rounds, 170 Fire Control Systems, 87 Projectile Simulators and 87 Sectionised Projectiles to be delivered in first year.	Compliant/ Non Compliant	
4.	Details of capability to develop similar equipments (Details of equipment supplied to Government Department in the past to be provided).	Compliant/ Non Compliant	
5.	Proposed system configuration (broad design details)	Provided/ Non Provided	
6.	<b><u>Nature of Business</u></b> . Manufacturing entity or System Integrator of defense equipment and not a trading company.	Compliant/ Non Compliant	
7.	<b><u>Experience</u></b> . Min 02 yrs, experience in broad areas like manufacturing / electronics/ explosive etc, as applicable in the instant case. If not, than cumulative experience of at least 03 years in above areas, resulting in gaining of competence for manufacturing the proposed product (Details of Existing manufacture related infrastructure/R&D/Quality control facilities to be provided).	Compliant/ Non Compliant	



<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
<b><u>PSQR Requirements</u></b>			
8.	<b><u>Weight.</u></b> Weight of the shell should not be more than 52 kgs.	Compliant/ Non Compliant	
9.	<b><u>Dimensions.</u></b> The dimensions should be such that the shell can be fired with all in-service 155mm/39/45/52 Calibre gun systems without any modifications.	Compliant/ Non Compliant	
10.	<b><u>Terrain &amp; Climatic Conditions.</u></b> It should be capable of functioning in all weather conditions as obtained in the Indian Subcontinent (in plains, deserts, semi-deserts, mountains and High Altitude Areas) as per DG MO letter No A/90220/OP TEMP/MO-9 dated 07 December 2012 and within temperature ranges as under:-  (a) Evaluation Temperature - As per JS 55555 for electronic (latest) components and as per JSG 0102 for the armament.  (b) Operational Temperature - -20°C to +45°C	Compliant/ Non Compliant	
11.	<b><u>Durability and Service Life.</u></b> It should be capable of being fired with all in-service 155mm/39/45/52 Calibre guns in high and low angles of fire and should be able to sustain the pressures generated in each calibre with the highest charges. Minimum expected shelf life of all components of the projectile is 20 years without any repairs.	Compliant/ Non Compliant	
12.	<b><u>Design.</u></b>  (a) The ammunition should be capable of sustaining firing stresses generated by all 155mm/39/45/52 Calibre guns whether In-Service or under induction or under planned induction.  (b) Design of the shell should be STANAG compliant as per internationally acceptable standards.	Compliant/ Non Compliant	

<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
	<p>(c) Shell design should be such that its natural frequencies do not match the frequencies generated by the charge system (whether Modular or Bag Charge). Thus, the resonance frequency of the shell should be well beyond the natural frequencies of the charge system.</p> <p>(d) The ammunition should be capable of being fired with highest charges using the in-service charges.</p>		
13.	<p><b><u>Compatibility.</u></b></p> <p>(a) <b><u>Calibre.</u></b> The ammunition should be compatible with all In-Service 155mm guns of 39/45/52 calibre gun systems.</p> <p>(b) <b><u>Charge System.</u></b> The ammunition system should be capable of being fired with the In-Service BMCS or Bag Charges both indigenous or ex import.</p> <p>(c) <b><u>Loading System.</u></b> The ammunition should be compatible to the loading mechanism of the gun systems that are In-Service.</p> <p>(d) <b><u>Satellite System.</u></b> The ammunition should be capable of receiving signals from GPS/GLONASS/IRNSS satellite systems.</p>	Compliant/ Non Compliant	
14.	<p><b><u>Range.</u></b></p> <p>(a) <b><u>Maximum Range.</u></b> The ammunition should be capable of achieving precision at 85% of maximum ranges using both Bag Charges and Modular Charges.</p> <p>(b) <b><u>Minimum Range.</u></b> The ammunition should be capable of being fired at the minimum ranges as achieved by in-service 39/45/52 calibre guns using Bag Charges and Modular Charges.</p>	Compliant/ Non Compliant	

<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
15.	<b><u>Guidance System.</u></b> Primary mode of Guidance will be through GPS/ IRNSS/GLONASS. Secondary mode of guidance in addition to the primary mode may be through MMW/LASER/IR.	Compliant/ Non Compliant	
16.	<b><u>Primary Mode of Guidance through GPS/IRNSS/GLONASS.</u></b> The ammunition should be capable of being guided by jam resistant internal GPS/IRNSS/GLONASS receiver. The guidance system should be roll stabilised for continued guidance. The system should be provided with an Inertial Navigation System/Unit (INS/INU) for continued and improved guidance to cater for GPS deprived environment.	Compliant/ Non Compliant	
17.	<b><u>Secondary Mode of Guidance through MMW/LASER/IR.</u></b> In addition to the Primary Mode, guidance may be provided using MMW/LASER/IR, wherein the designator will also be provided along with the ammunition system. The ammunition in this case, will be guided by GPS/IRNSS/GLONASS during its flight and will be terminally guided to further improve precision.	Compliant/ Non Compliant	
18.	<b><u>Angle of Fire.</u></b> The ammunition should be capable of being fired at both Low and High Angles of Fire.	Compliant/ Non Compliant	
19.	<b><u>Angle of Approach to the Target.</u></b> Guidance system of the ammunition must allow it to change its ballistic trajectory and approach target at near vertical angle of minimum 80°.	Compliant/ Non Compliant	
20.	<b><u>Circular Error of Probability (CEP).</u></b> CEP of the ammunition should be less than 10 meters for all ranges while being guided in any terrain, ie plains, semi deserts, deserts, mountains and High Altitude Areas(HAA).	Compliant/ Non Compliant	
21.	<b><u>Multi-Modal Fuze.</u></b> It should be provided with Point Detonation function, Proximity function and Delay function (to enable penetration upto 8 inches of reinforced concrete).	Compliant/ Non Compliant	

<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
22.	<p><b><u>Mission Planning Equipment.</u></b></p> <p>(a) <b><u>GPS guidance.</u></b> The system should be provided with a Military Grade robust and electronically hardened standalone Mission Planning Equipment to feed the mission data in the ammunition. The system should also be provided with a handheld device to provide accurate position location to the Observation Post Officer for accurate target acquisition.</p> <p>(b) <b><u>MMW/LASER/IR Guidance.</u></b> The system should be provided with a Designation System, capable of illuminating the target, which can operate either from a ground based Observation Post Officer/Air Observation Post Officer from a helicopter/remotely controlled Unmanned Aerial Vehicle (UAV). The ammunition should be capable of receiving these target illuminating signals and then home onto the target.</p>	Compliant/ Non Compliant	
23.	<p><b><u>Power Supply.</u></b> The fuze should be powered by super capacitors actuated by firing of the ammunition for providing power supply to the electronics.</p>	Compliant/ Non Compliant	
24.	<p><b><u>Accuracy.</u></b> 10 meters CEP at both High and Low Angle of fire.</p>	Compliant/ Non Compliant	
25.	<p><b><u>Base Bleed.</u></b> Contingent to the maximum range already specified at Design Parameters.</p>	Compliant/ Non Compliant	
26.	<p><b><u>Electronic Counter Measures (ECM) and Electronic Counter Counter Measures (ECCM).</u></b> The ammunition should be resistant to jamming. It should have inbuilt ECCM features. It should also be provided with ECM features which could enable it jam radio frequency generating devices along its trajectory.</p>	Compliant/ Non Compliant	

<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>
27.	<p><b><u>Safety.</u></b></p> <p>(a) <b><u>While Firing.</u></b>It should be robust enough to sustain pressures in the chamber and in the barrel when fired with highest charges (both Modular and Bag Charges) in a 155mm/39/45/52 calibre gun.</p> <p>(b) <b><u>During Flight.</u></b> It should have safety mechanisms that ensure safety during flight.</p> <p>(c) <b><u>Incremental Safety.</u></b> The safety mechanisms should be incremental in nature, in a manner that failure at any one level should not allow arming of the ammunition.</p> <p>(d) <b><u>During Handling and Transportation.</u></b> The ammunition should be safe during transportation by rail, road and air and while handling. No additional preparations/precautions should be needed.</p> <p>(e) <b><u>Air Transportation and Air Dropping.</u></b> It should be safe during air transportation and must be '<b><i>Fit for Air Drop</i></b>'. Adequate markings should be evidently seen during day and at night for "Fit for Air Drop" and adequate tests must be carried out prior to this certification in accordance to parameters laid down in STEC (Storage &amp; Transportation of Explosives Committee) pamphlet.</p>	Compliant/ Non Compliant.	
28.	<p><b><u>Suitability to Environmental Conditions.</u></b> It should be compliant to JS5555, Mil Std 810-F, JSG 0102 and IS Specification 10236 series, as applicable.</p>	Compliant/ Non Compliant	

<u>Ser No</u>	<u>Criteria and Sub Criteria</u>	<u>Vendor Response</u>	<u>Remarks (if Any)</u>																	
29.	<p><b><u>Preservation During Use and Storage.</u></b> The ammunition should be suitable to be stored and used under field conditions. Storage conditions are as under:-</p> <table border="1"> <thead> <tr> <th>Ser</th> <th>Storage</th> <th colspan="2">Temperature</th> <th>Shelf Life</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>(a)</td> <td>Controlled</td> <td>-17°C</td> <td>+37°C.</td> <td>20 yrs</td> <td rowspan="2">Humidity indicator is mandatory on projectile</td> </tr> <tr> <td>(b)</td> <td>Uncontrolled</td> <td>-53°C</td> <td>+71°C.</td> <td>02 yrs</td> </tr> </tbody> </table>	Ser	Storage	Temperature		Shelf Life	Remarks	(a)	Controlled	-17°C	+37°C.	20 yrs	Humidity indicator is mandatory on projectile	(b)	Uncontrolled	-53°C	+71°C.	02 yrs	Compliant/ Non Compliant	
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30.	<p><b><u>Reliability.</u></b> Reliability of functioning of the ammunition should not be less than 95% in all environmental conditions as obtained in the Indian Subcontinent. Fog, rain, snow, dust/sand &amp; obscurants should not affect GPS or terminal guidance mechanisms.</p>	Compliant/ Non Compliant																		
31.	<p><b><u>Environmental Requirements.</u></b> The ammunition should be capable of storage and performance in all terrain, climatic conditions as obtained in the Indian Subcontinent and in compliance with the temperature ranges given in JS 55555, Mil Std 810-F, JSG 0102 and IS Specification 10236 series, as applicable.</p>	Compliant/ Non Compliant																		
32.	<p><b><u>Manufacturing Process.</u></b> The manufacturing process must be suited for mass production with minimum defects. It should follow the best practices as per ISO/IEC quality standards or any equivalent quality standards or better standards.</p>	Compliant/ Non Compliant																		

<b><u>Ser No</u></b>	<b><u>Criteria and Sub Criteria</u></b>	<b><u>Vendor Response</u></b>	<b><u>Remarks (if Any)</u></b>
33.	<b><u>Shelf Life.</u></b> Minimum Shelf Life of the ammunition should be 20 years.	Compliant/ Non Compliant	
34.	<b><u>Packing/Marking.</u></b> The ammunition should be hermetically sealed in weatherproof containers and have the standard markings as per the in service ammunition.	Compliant/ Non Compliant	
35.	<b><u>Compliance Certificate</u></b>		
	(a) Correctness Certificate (As per Appendix D)	Compliant/ Non Compliant	
	(b) Confidentiality Agreement (As per Appendix E)	Compliant/ Non Compliant	
	(c) Eol Compliance Certificate (As per Appendix F)	Compliant/ Non Compliant	

Station:

Signature

Company Seal

Date:

**Note :**

1. All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not assessed.

**CORRECTNESS CERTIFICATE**

It is certified that information submitted in the documents as part of the response to Expression of Interest for the project of 155 mm Terminally Guided Munition (TGM) is correct and complete in all respects. It is acknowledged that the company will be disqualified from further participation if any information provided is found to be incorrect.

Signature with Company Seal

**Note :**

1. All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not be assessed.



**CONFIDENTIALITY AGREEMENT**

1. It is certified that Expression of Interest document for project of 155 mm Terminally Guided Munition (TGM) will not be shared with any agency in part or full any other agency. Only relevant details, as applicable, will be shared with technology partners including foreign technology partners. However, the Eol document itself will not be shared with any technology partners.
2. The company understands the security sensitivity of such an operational systems and any information pertaining to deployment and usage of the system including system scaling will not be discussed with third party without a written permission from the Project Facilitation Team. The company understands that failure to observe this agreement will lead to disqualification from the project.

Signature with Company Seal

**Appendix F**  
(Refers to Para 38 of Eoi)

**Eoi COMPLIANCE CERTIFICATE**

It is certified that all the aspects mentioned in the Expression of Interest for the procurement of 155 mm Terminally Guided Munition (TGM) are being complied to. It is acknowledged that the company will be disqualified from further participation if any aspect mentioned in Expression of Interest is not complied with.

Signature with Company Seal

**Note :**

1. All submissions must be on printed copy of Appendix as uploaded on MoD website and should be supported by referenced documents duly authenticated.
2. Any input with incorrect or missing reference will not be assessed.

**INFORMATION PERFORMA**

1. Name of the Company.
2. Name of CEO with Designation.
3. Address of the Registered Office.
4. Address of the Factory / Factories.
5. Company Website(s).
6. Date of Incorporation.
7. Brief History of the Company.
8. Category of Industry (Large / Medium / Small / Micro).
9. Nature of Company (Public Limited/ Private Limited).
10. Nature of Business (Manufacture / Trader / Sole selling or Authorised Agent/ Dealer / Assembler / Processor / Re packer/ Service Provider). Please give broad product range as applicable
11. Details of Current Products :-
  - (a) Type / Description.
  - (b) Licensed / Installed Capacity.
  - (c) Annual Production for Preceding 3 Years.
12. Details of Foreign Collaborations if any planned for execution of project.
13. Technology Received from abroad and assimilated / planned for execution of project.
14. Products Already Supplied :-
  - (a) To Indian Army / Air Force / Navy.
  - (b) PSUs.
  - (c) DRDO and its Laboratories.
  - (d) Ordnance Factories.

- (e) Any other Defence Organisation.
- (f) To other Principal Customers.

15. Details of Developmental Facilities :-

- (a) R&D Facilities Available.
- (b) Number of Technical Manpower.
- (c) Percentage of Total Turn-Over Spent on R&D during the Last Three Years.

16. Turn-Over during the last Three financial Years.

17. Any other relevant information.

18. Contact Details of the Executive nominated to co-ordinate with the Assessment Team (Please provide telephone, mobile and e-mail address).