Corrigendum Notice

OFFICE OF THE DG & IG OF POLICE, JHARKHAND, RANCHI-834004.

With reference to advertisement No. 215083\ (Police) 2020-21 regarding Supply of FSL Equipments for Jharkhand Police Re-Tender No.03/2020-21 by Police Headquarters, Jharkhand, Ranchi following modifications have been made after Pre-Bid Conference:-

The last date for submission of Tender Document is amended as 07-09-2020 by 15.00 hrs.
Opening of the tender paper is amended as 07-09-2020 by 16.00 hrs.

Document related to Pre- Bid queries, response and amendments can be downloaded from Jharkhand Police web-site “jhpolice.gov.in”.

Memo No. 299 /TS, dt. 25/08/2020
06.22.2017 (Part)

Copy to:- 1. Director, PRD, Jharkhand ,Ranchi for kind information and necessary action
2-. Data Centre, PHQ, Ranchi for information and necessary action.

I.G of Police (Provision)
Jharkhand, Ranchi.
**General Terms and Conditions (revised):**

1. Bids must be submitted by OEM or OEM supported single vendor only with original authorization certificates from OEM.
2. Only sealed tenders shall be accepted.
3. The tender must be submitted in two sealed envelopes Technical Bid (Envelope-1) and Financial Bid (Envelope-2). Incomplete tenders received after due date shall not be entertained.
4. The bid submitted by Fax/Email shall not be considered. No correspondence will be entertained in this matter.
5. Bidders shall submit their offer price in INR with applicable taxes rates.
6. Vendors are also requested to submit the list of users of the State/Central Government Organization along with their address.
7. The vendor should be ready to demonstrate the functionality of the equipment as and when required by the technical committee at the time of technical evaluation.
8. Extra price for accessories (if any) should be clearly mentioned in the price bid.
9. **Warranty:** Must provide 02 years comprehensive warranty after successful installation ensuring trouble free service including spares parts of the equipment.
10. **Training:**
   - (i) Hands on training should be given to the Scientists during installation at the customer’s site to the satisfaction of the buyer & user and supply application notes and study materials at the place of installation.
   - (ii) Must provide application training as and when required free of cost.
11. **Service support:** The maintenance service of the instrument/software should be done by qualified & trained service engineers and breakdown of the instrument/software should be attended within 72 hours of registering the complaint.
12. **Annual Maintenance Contract (AMC):**
   - (i) The Instrument will be under AMC after expiry of 02 years Warranty Period Services for further 08 years or more.
   - (ii) Vendor should quote year wise rate of AMC for 08 years after warranty period is over (AMC amount will not be included in the main bid).
   - (iii) In the event of breakdown, the party shall ensure that the fault will be attended within 72 hours from the date/time of intimation by the organization.
   - (iv) The machine would undergo preventive maintenance once every quarter. Joint certificate to be signed every quarter.
   - (v) Regular maintenance service will be provided during general shift of SFSL working hours on weekdays only (5 working days).
13. Price quoted shall be best competitive/minimum price applicable for Government Laboratory.
14. The authority does not bind itself to offer any explanation to those bidders whose technical bid has not been found acceptable by the evaluation committee.
15. The authority may accept or reject any or all the bids in part or in full without assigning any reason and does not bind itself to accept the lowest bid. The Institute at its discretion may change the quantity/upgrade the criteria/drop any item or part thereof at any time before placing the Purchase Order.
16. If it is found that the bidder/vendor furnished fraudulent document/information, they will be debar for a period of at least 3 years beside the legal action.
17. At any time prior to date of submission of tender, Tender Inviting Authority may, for any reason or decision, modify the terms & conditions of the tender document by issuing a corrigendum. Tender
18. The vendor should give a compliance report of each specification and should also enclose relevant supporting literature in the form of company broacher/printed matter highlighting & marking the technical specifications.

19. The vendor should follow other Terms and Conditions mentioned in Tender Notice.

20. In case of any dispute, the decision of the authority shall be final and binding on the bidders.

21. Legal matters will be subjected to Ranchi Jurisdiction only.

22. For any query pertaining to this technical specification, correspondence may be addressed to Sri Rakesh Kumar Rana, Assistant Director/ Sri Subrato Sarkar, Assistant Director at State Forensic Science Laboratory, Hotwar, Ranchi, Pin-835217, Phone: 0651-2270016, FAX: 0651-2270095, Email: sfslorjhpolice.gov.in

23. **Buy back policy** for the old existing instruments (as mentioned in technical specification individually) should be followed. Interested Agency/Vendor must clearly quote the Buyback price for the instrument in the price BID as such.

<table>
<thead>
<tr>
<th>Price with Buyback</th>
<th>Price without Buyback</th>
</tr>
</thead>
</table>

[Signatures and dates]
## Specification for Gas Chromatograph with Head Space auto sampler (Revised)
### (Under Buyback Option)

<table>
<thead>
<tr>
<th>Purpose</th>
<th>For the analysis of Blood Alcohol, Alcoholic Beverages, Narcotic Drugs and Petroleum Adulteration.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General features</td>
<td>Fully automated microprocessor controlled with extensive self-diagnostic facilities with upgradeable to MS/MS system in future. <strong>Supports simultaneously: Two inlets &amp; Two detectors</strong> The GC must feature a complete touch-screen user interface ideal for direct instrument control in larger routine and method development and should be capable of installing multiple instant connect detectors &amp; injectors based on requirement by the user without the need of service engineer. It should be possible to control the system completely through a data station consisting of a computer and GC software.</td>
</tr>
<tr>
<td>System control</td>
<td>Windows based Software (Original with part number) and should be able to control all GC parameters through computer and validation package should be provided for the entire system.</td>
</tr>
</tbody>
</table>
| Flow control | - Must come standard with programmable pneumatic control  
- Digital Pneumatic Control for setting column flow with pressure, flow and linear velocity  
- Pneumatic program rates 0 – 140 psi or better with 0.1 psi increment  
- Pressure set point and control precision must be ±0.001 psi or better for low pressure and retention time locking applications |
| Inlet configuration | **Two Injectors as given below:**  
1. **Split/Splitless Capillary Injector with Packed Column Adaptor : 1 No**  
   - The injector needs to permit large volume Splitless injection (up to 50 microliters) without requiring pressure pulse to quantitatively recover the whole sample, and without any further hardware requirement.  
   - The injector to allow timed closure/opening of the purge line.  
   - Maximum Temperature: 400 °C  
   - Split Ratio: up to 7500:1 or better  
   - Pressure Range: 0–1000 kPa (0–145 PSI)  
   - Total Flow Setting: Control of split flow in 1 mL/min from 0 to 1250 mL/min  
2. **Programmed Temperature Vaporiser (PTV) Injector: 1 No**  
   - To Support hot/cold split and split less modes as well as large volume injections (solvent split) and cold on Column injection  
   - Temperature Range: Air forced cooling to ambient +5 °C up to 450 °C  
   - Temperature programming the injector up to 3 ramps and 4 plateaus  
   - Heating rate up to 700 °C/min or better  
   - Pressure Range: 0–1000 KPa (0–145 PSI)  
   - Split Ratio: Up to 7500:1 or better  
   - Purge flow from 0 to 50 mL/min  
   - Control of split flow in 1 mL/min from 0 to 1250 mL/min  
   - Accommodates up to capillary columns or two stainless steel packed columns  
   - Operating temperature range suitable for all columns and chromatographic separations.  
   - Oven temperature range up to 450 °C or higher  
   - Temperature set point resolution: 0.1 °C  
   - Supports 20 or more ramps facilities settable maximum 120°C/minute  
   - The oven should have excellent temperature control and fast cool down system (Oven cool down time from 250°C to 50°C in less than 4 minutes) |

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*25 AUG 2020*

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*Kam: 25 AUG 2020*

*Singh: 25 AUG 2020*
Compatible for analysis of Blood Alcohol, Alcoholic Beverages, Narcotic Drugs and Petroleum Adulteration.

<table>
<thead>
<tr>
<th>Analysis required</th>
<th>Column type</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Blood Alcohol Analysis</td>
<td>(i) TG-ALC1/DB-ALC1 30Mx0.32Mx1.8 μm or Equivalent or better - 1 No</td>
</tr>
<tr>
<td></td>
<td>(ii) TG-ALC2/DB-ALC1 30Mx0.32Mx1.2 μm or Equivalent or better - 1 No</td>
</tr>
<tr>
<td>Alcohol &amp; Petroleum Adulteration</td>
<td>(iii) TG-WAXMS/DB-WAX GC COL 60mx32mm or Equivalent or better -1 Nos-</td>
</tr>
<tr>
<td></td>
<td>(iv) TG-624/DB-624 GC COL 30mx53mm or Equivalent or better -1 No</td>
</tr>
<tr>
<td></td>
<td>(v) TG-WAXMS/DB-WAX GC COL 30mx25mm or Equivalent or better -1 No</td>
</tr>
<tr>
<td>Routine Analytical Work, Hydrocarbons, essential oil, pesticides, etc.</td>
<td>(vi) TG-1/DB-1 GC COL 30 m length, 0.25 mm ID, 0.25 μm) or Equivalent or better - 1 No</td>
</tr>
<tr>
<td>Narcotic drug application.</td>
<td>(vii) TR-DoA35 (35% ENGINEERED) 15M X 0.20MM ID or Equivalent or better - 1 No-</td>
</tr>
<tr>
<td></td>
<td>(viii) TR-DoA5 (5% ENGINEERED) 30M X 0.25MM ID or Equivalent or better - 1 No</td>
</tr>
<tr>
<td>Semi-volatiles, phenols, amines, pesticides, residual solvents, PCB congeners, drugs of abuse</td>
<td>(ix) TG-5MS/DB-5 30m x 0.25mm x 0.25μm or Equivalent or better - Column -1 No</td>
</tr>
</tbody>
</table>

General Use | (x) Pre-column: 5Mx 0.32mm -4 Nos |

1. **Thermal Conductivity Detector (TCD) - 1 Nos**
   - Thermal Conductivity Detector module: dual filament, single column detector with high performance in terms of sensitivity featuring acquisition rate as high as 300 Hz;
   - MDL = <400 pg tridecane/ml with He carrier or <20 pg tridecane/s with a total flow through the cell of 3ml/min;
   - Linear dynamic range= 10^3
   - Integrated electronic gas control, capillary column optimized (micro TCD) compatible with 1/8" and 1/16" packed column;
   - Max T = 400°C.

2. **Flame Ionization Detector (FID) - 2 Nos**
   - Capillary column optimized compatible with 1/8" and 1/16" packed column
   - Flameout detection and automatic re-ignition
   - MDL: <1.4 pg C/s
   - Sensitivity: >0.03 Coulombs/gC
   - Linear Dynamic Range: >10^2 (±10%)
   - Maximum Temperature: 450 °C in steps of 0.1 °C
   - Integrated Electronic for suitable controls of the following gases
   - Data Acquisition Rate: up to 300 Hz or better

3. **Nitrogen Phosphorus Detector (NPD) - 1 No.**
Annexure-3

Specification of Gas Chromatograph

- NPD available with ceramic beads and compatible with element-specific sources
- MDL: <20 fg P/s and <100 fg N/s with standard ceramic bead
- Selectivity: gP/gC = 200000; gN/gC = 80000
- Linear Dynamic Range: 10^4
- Maximum Temperature: 450 °C in steps of 0.1 °C
- Integrated Electronic for Suitable Controls of the gases.
- Data Acquisition Rate: up to 300 Hz or better

Auto sampler
- Auto liquid Injector for GC with minimum Vial capacity - 100 or more
- Vial capacity: 2 ml
- Optional micro-volume vials: 300μl
- Injections/vial: 0-99
- Viscosity delay: Yes/No
- Syringes: Standard: 10μl

Head Space

- Headspace sampler is required for injecting volatile compounds samples/blood into GC for the estimation of residuals for solvent free extraction
- 12 Vials upgradable to 120-vial capacity.
- Vial size: To use 10 ml, 20 ml, and 22 ml headspace vials with Magnetic crimp or screw caps; flat or rounded bottom without any need of Vial adapter
- Dimensions, including septum and cap:
  - 10 ml size: min 46.5 mm – max 49.5 mm height
  - 20/22 ml size: min 75.5 mm – max 79.0 mm height
  - for all sizes: min 22.25 mm – max 23.50 mm outer diameter
- Oven capacity: Air ventilated oven with 12-seat electrically-driven carousel
- **Simultaneous Sample overlapping:** Up to 10 or more vials
- Operational Parameters: Oven temperature OFF or from ambient +5 °C to 300 °C, settleable in 1 °C increments, and with 0.1 °C read out
- Transfer line temperature up to 300°C

Gas Generators

- Must provide latest branded **Hydrogen, Nitrogen and Zero Air Gas Generators**
- with suitable oil free Air Compressor and all required tubing and fitting for Manifold Gas distribution panel at site

**Technical Specification for Nitrogen Gas Generator:**
- Max Flow Rate: 250cc/min
- Max Pressure: 80 psi / 5.5 bar
- Purity: > 99.9995%
- Hydrocarbon Content: < 0.05 ppm
- Gas Outlets: 1 x 1/4" BSPP
- Min/Max Air Inlet Pressure: 120-145 psi / 8.3-10 bar
- Min Air Inlet Flow: 18 lpm
- Min Inlet Air Quality: ISO8573 - 1:2010 Class 1.4.1
- Phthalates: None
- Suspended Liquids: None
- Start-Up Time For Purity: 1.5 Hours
- Noise Level: Silent in operation

**Technical Specification for Zero Air Generator:**
- Max Flow Rate: 1.51/min
- Max Pressure: 80 psi / 5.5 bar
**Annexure-3**

### Specification of Gas Chromatograph

- Hydrocarbon Concentration (as Methane): <0.05ppm
- Gas Outlets: 1 x 1/4" BSPP
- Min/Max Air Inlet Pressure: 90-145 psi / 6.2-10 bar
- Min Air Inlet Flow: 1.5L/min
- Min Inlet Air Quality: ISO8573 - 1:2010 Class 1.4.1
- Phthalates: None
- Suspended Liquids: None
- Start-Up Time For Purity: 60 minutes

### Technical Specification for Hydrogen Gas Generator:

- Max Gas Flow: 250cc/min
- Max Output Pressure: 100psi/6.9bar
- Max Purity: 99.9999
- Gas Outlets Fitting: 1 x 1/8" Swagelok compression fitting
- Water Purity Requirements: ASTM Type II (<1 μS/cm / >1 MΩ-cm)
- Water Consumption: 0.17-0.46 L/Day
- Start Up Time: 90 mins or less

### Technical Specification for oil free Air Compressor:

- Compressed air supply for Precision Nitrogen and Zero Air generators
- Single unit can supply both the Precision Nitrogen and Zero Air generators in a stack
- Duplex compressor mounting system to dampen noise and vibration
- Must provide branded complete workstation for the instrument with proper access from all sides.
- Must provide branded Standard modular table for the instrument with storage facility & electrical points with accessories and
- Must provide branded revolving executive chairs 2 nos.

### Software

- Should be provided with latest available Software performing data analyses, calibration, blank correction, data import, export, handling and reporting, quality control protocols, computer based training.
- The instrument software must be provided in a Disk as well as in pen drive.
- If the instrument software upgraded, then must have to provide the upgraded software free of cost up to 10 years or more.
- Instrument must be controlled with both PC and laptop hence have to provide software in both.

### Power requirements

- Line voltage: 120/200/220/230/240 Volts ±10 % of nominal
- Frequency: 50/60 Hz ±5 %

### Installation Accessories

- **Following Accessories must be supplied at the time of installation**

  1. Desktop PC (Branded/HP)
     - CPU: Suitable latest Computer with licence
     - Operating system: Win 10 pro 64 bit (License Version Or Upgraded version at the time of delivery)
     - Processor: Intel® Core™ i5-8500 with Intel® UHD Graphics 630
     - Processor family: 8th Generation Intel® Core™ i5 processor
     - Chipset Intel® Q170
     - RAM: 8 GB DDR4-2666 SDRAM (1 X 8 GB)
     - Hard drive: 1TB 7200 rpm SATA
     - Storage type: HDD
     - Optical drive: DVD Writer
     - Graphics: AMD Radeon™ R7 430 Graphics (2 GB GDDR5 dedicated)
### Specification of Gas Chromatograph

**Ports**: 1 audio-in; 1 audio-out; 1 power connector; 1 RJ-45; 2 DisplayPort™ 1.2; 2 USB 2.0; 2 USB 3.1 Gen 1; 2 USB 3.1 Gen 2

**I/O Port location**: Front

**Network interface type**: LAN

**Network interface**: Integrated Intel® I219LM GbE LOM

**Keyboard**: USB type

**Mouse**: optical USB

**Other Ports**: must have all the other ports required for GC instrument.

**Monitor**: 23.8" IPS with LED backlight; Display area (metric) 52.7 x 29.64 cm;

**Aspect ratio**: 16:9; Resolution (native) FHD (1920 x 1080 @ 60 Hz); 1 HDMI 1.4 (with HDCP support); 1 VGA

**Printer**: Branded Wi-Fi enabled B/W Laser Jet printer with print, scan & copy (automatic both side printing facility) should provide along with system

2. **Laptop**: (branded/HP) 15.6" diagonal FHD IPS anti-glare LED-backlit (1920 x 1080), Windows 10 Pro 64 bit, Intel® Core™ i5-1035G1 Processor (1.0 GHz base frequency, up to 3.6 GHz with Intel® Turbo Boost Technology, 6 MB cache, 4 cores); 8 GB DDR4-2666 SDRAM (1 x 8 GB); 1 TB 5400 rpm SATA, Fingerprint Sensor; 2 USB 3.1 Gen 1 (charging); 1 Thunderbolt™ (USB Type-C™ connector); 1 RJ-45; headphone/ microphone combo; 1 HDMI 1.4b; 1 docking connector; 1 AC power Long Life 3-cell, 56 Wh Li-ion Battery.

3. Hydrocarbon and oxy traps with Manifold Gas distribution panel with installation at site - 1 set.

4. One branded cabinet for keeping the consumables & spares with lock and key.

5. Crimper and De-crimper- 1 set imported

6. Hot Air oven for vial dry purposes-1 number

7. **Standard Tool kit**: Complete set of required Spinners, screw-drivers, wrenches, Keys etc. for Instrument maintenance

8. Application Notes with sampling technique: Must have to provide New upgraded and validated application notes with sampling techniques.

9. Any other accessories required to make the instruments functional should be quoted with tender separately.

### Spares and Consumables

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syringe with needle for auto sampler</td>
<td>3 set</td>
</tr>
<tr>
<td>Micro syringe for manual injection (10 micro ltr)</td>
<td>2 set</td>
</tr>
<tr>
<td>Micro syringe for manual injection (05 micro ltr)</td>
<td>2 set</td>
</tr>
<tr>
<td>Packed column</td>
<td></td>
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<tr>
<td>Capillary column</td>
<td></td>
</tr>
<tr>
<td>Cooper tube cutter</td>
<td>02 nos.</td>
</tr>
<tr>
<td>Capillary tube cutter</td>
<td>02 nos.</td>
</tr>
<tr>
<td>Sample vials</td>
<td>2000 vials</td>
</tr>
<tr>
<td>Column Nuts and fittings</td>
<td>50 sets</td>
</tr>
<tr>
<td>Washers of different sized</td>
<td>50 nos.</td>
</tr>
<tr>
<td>ferrules of different sizes</td>
<td>50 nos.</td>
</tr>
<tr>
<td>Septa</td>
<td>500 pcs</td>
</tr>
<tr>
<td>rings</td>
<td>50 nos.</td>
</tr>
<tr>
<td>Others important required consumables:</td>
<td>50 nos.</td>
</tr>
</tbody>
</table>

Any other consumables required to make the instruments functional has to be given free of cost at the time of installation.

### Warranty

Must provide 02 years comprehensive warranty after successful installation ensuring trouble free service including spares parts of the equipment...
<table>
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<tr>
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<td>materials at the place of installation.</td>
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<td>(i)</td>
<td>Must provide application training as and when required free of cost &amp; initially for</td>
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<td></td>
<td>five working days after installation.</td>
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<td>Service support:</td>
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<td>(i)</td>
<td>The maintenance service of the instrument /software should be done by qualified &amp;</td>
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<td>Annual</td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
</tr>
<tr>
<td>Contract</td>
<td>(AMC):</td>
</tr>
<tr>
<td>(i) The Instrument</td>
<td>Will be under AMC after expiry of 02 years Warranty Period Services for further 08</td>
</tr>
<tr>
<td></td>
<td>years or more.</td>
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<td>(ii) Vendor</td>
<td>Should quote year wise rate of AMC for 08 years after warranty period is over.</td>
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<td>(iii) In the event</td>
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<td>Joint certificate to be signed every quarter.</td>
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<td>(v) Regular main</td>
<td>tenance service will be provided during general shift of SFSI. working hours on</td>
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<td></td>
<td>weekdays only (5 working days).</td>
</tr>
<tr>
<td>Buyback Policy</td>
<td></td>
</tr>
<tr>
<td>(i) The agency/Vendor</td>
<td>If interested can ensure the condition of Gas Chromatograph (Model Varian 3800)</td>
</tr>
<tr>
<td></td>
<td>available in the Chemistry Division, SFSI, Hardwar, Ranchi Jharkhand under buy back</td>
</tr>
<tr>
<td></td>
<td>within the period of 15 days from date of posting of the advertisement on website/</td>
</tr>
<tr>
<td></td>
<td>Newspaper. The agency/vendor may contact with the director through Email on</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:sfsi@phdcecegov.in">sfsi@phdcecegov.in</a> Phone: 0651-2270016, Fax: 06512270095, for asking the prior</td>
</tr>
<tr>
<td></td>
<td>permission to see the condition of equipment.</td>
</tr>
<tr>
<td>(ii) Interested Agency</td>
<td>Vendor must clearly quote the Buyback price for the above mentioned instrument in the</td>
</tr>
<tr>
<td></td>
<td>price BID as such</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
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<th>Price without Buyback</th>
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Purpose:

In Forensic Ballistics, the experts examine the Arms, Fired shells, Fired bullets and the live cartridges in the laboratory. When firearms are involved in a forensic context, the identification of the firearm is usually among the main questions to address. Thus, if a questioned bullet is found on a crime scene and a questioned firearm seized - either on the scene or through the following investigation - the next step is to obtain reference material. A Test Firing process in controlled conditions is then conducted by discharging the questioned firearm using ammunition sharing ideally the characteristics of the questioned bullet (i.e. brand, model, weight, casing). Such tests necessarily involve bullet recovery systems. They are devices designed to stop the reference bullets without causing them any damage that might deter the marks examination. In State Forensic Science Laboratory, Jharkhand, A well equipped Ballistics Testing Equipment is very much needed for more accurate and safe examination particularly for Country made firearms as the ballistics related cases are monotonically increasing day by day.

About:

Ballistics Testing Equipment is widely used for a variety of ballistics related examinations in Defence, Security and Space Organization. Some parts of Ballistics Testing Equipment are required and relevant for Forensic Ballistics. They are as follow:-

1. Mobile Firing Rest System (MFRS)
2. Bullet Recovery Box (BRB)
3. Muzzle Velocity Measurement System (MVMS)

Requirements and specification of MFRS

1. It must be Suitable to fire various small arms as well as rifles of all known calibers including country made and also useful to measure the trigger pull.
2. Should have the latest user friendly software for measuring trigger pull and archive the data and to generate report.
3. Elevation and azimuth range: +/- 50.
4. Should have wheels and transport tow bar.
5. Accessories:
   a) Remote firing control with electronics box.
   b) Rifle adaptors.
   c) Pistol and revolver adaptors.
   d) Laser guide.
   e) Recoil energy measurement facility.
6. Data processing unit:
   a) PC (i5 processor or better, with 4 GB RAM, 1 TB SATA HDD, Optical DVD writer, 27" monitor, Licensed pre-loaded OS Microsoft windows 10 pro or better and quality internet security Antivirus (licensed).
b) Printer: Laser color printer of 1200 X 600 dpi resolution or better.

**Requirements and specification of BRB**

1. Bullet Recovery Box should be made of stainless steel material (Rust Proof) with movable trolley with lock adjustment.
2. Dimensions (L X W X H) at least: 10 X 2 X 2 feet
3. Height from Ground: Proportionate to the remote mobile firing Rest.
4. BRB must be filled with Ballistic Gelatin like material or Rubininm fleece for easy recovery of bullets avoiding any deformation for successful comparison.
5. Range of firing for a particular caliber should be determined

**Requirements and specification of MVMS**

1. Velocity should be measured in the range of 50 to 1500 m·s⁻¹
2. Rate of fire should be measured in the range of 60 to 3000 min⁻¹
3. Caliber of projectiles should be in the range of 5 to 20 mm
4. Area observed not be less than 0.6 meter²
5. Time of flight should be measured
6. Data presentation on standard PC (Desktop, Notebook). The software should be suitable for Windows 10 or above version
7. Immediate display of velocity and rate of fire values. Presentation of statistically processes values (minimum, maximum, average)
8. Calculation drop of velocity (two MVMS/Light gate required)
9. Optical scanning of passage of projectile
10. Integrated evaluation unit equipped with WLAN communication module, Ethernet interface.

**Required quantity:**

One of each part

**Approximate Cost:** (+/- 10 %): Rs: 40,00000