



वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्  
Council of Scientific & Industrial Research  
राष्ट्रीय वांतरिक्ष प्रयोगशालाएं  
National Aerospace Laboratories


NAL/PUR/FMCD/239/22-Z

16-May-2023

**CORRIGENDUM**



In continuation to our tender no. NAL/PUR/FMCD/239/22-Z (Tender ID: 2023\_CSIR\_151448\_1) uploaded on 12-May-2023, for “Design development assembly and installation of visual projection system”, please note the changes as per annexure enclosed and kindly ignore the corrigendum(s) hosted earlier.

Kindly, note that all other terms and conditions of the tender shall remain the same.

  
Controller of Stores & Purchase  
For and on behalf of CSIR

Encl: Annexure


Sl No	Clause no, Pg in RPF	Current description / requirement	Bidder's comments	Remarks	Amendment of Tender document
1	Chapter - 4,Page no 49,Point-6	Projectors-Three projectors shall be used to cover the above said FOV. The projectors shall be mounted above the cockpit shell without obstructing visibility from cockpit. The mounting of projectors shall not obstruct free movement of personnel / pilots from/to cockpit. As the room floor-ceiling height is 8 m, a self-supporting rigid gantry structure firmly grouted to ground to be designed and erected for mounting the projectors. There shall be an overlap of about 10% between two projectors. Vendor can decide on the suitable projector – lens configuration to suit the requirements Vendor shall supply one spare projector – lens	Projector should support Ultra High Maintenance Free Operation: Should deliver an extremely long at least 20,000 hours of Operation without maintenance or replacement. Automated Filter cleaning system should remove dust every 100 hours.	An Automated filter system increases the overall cost of the project. This was discussed with ADE simulation team, they also felt current projectors are quite rugged and a simple covering around the projectors should reduce the dust accumulation. Filter cleaning every six months is sufficient	Projectors-Three projectors shall be used to cover the above said FOV. The projectors shall be mounted above the cockpit shell without obstructing visibility from cockpit. The mounting of projectors shall not obstruct free movement of personnel / pilots from/to cockpit. As the room floor-ceiling height is 8 m, a self-supporting rigid gantry structure firmly grouted to ground to be designed and erected for mounting the projectors. There shall be an overlap of about 10% between two projectors. Vendor can decide on the suitable projector – lens configuration to suit the requirements Vendor shall supply one spare projector – lens combination (Total 4 Projectors-cum lens)

  
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		combination (Total 4 Projectors-cum lens)			Vendor shall clean filters of projectors every six months during the warranty period
2	Chapter - 4,Page no 49,Point-7	Projector Type-Laser projectors with input resolution of atleast 1920 X 1200 pixels @ 60 Hz, WUXGA.	laser Light Source display should be specified : Should be a 3 LCD panel Laser Light Source	Accepted	Projector Type - 3-chip LCD Laser projectors with input resolution of atleast 1920 X 1200 pixels @ 60 Hz, WUXGA
3	Chapter - 4,Page no 49,Point-8	Average Brightness-The projectors should be capable of emitting atleast 7000 lumens in normal mode operation.	Colour Light Output: Should be minimum 9000 lumens or higher to accommodate 20-25 % loss	As per our design, with covering around the screen and projectors, 7000 lumens is sufficient for pilot's view	No change required
4	Chapter - 4,Page no 49,Point-1	Effective Field of view (FOV) wrt DEP	As per the design requirement lens front cannot go beyond 4.5 mtr from the screen ( throw ratio is very important) so we recommends to specify the Projector Lens: Zoom and Focus should powered and manual both with lens shift function of at least +/- 20 degrees. The	Using the requirements – FOV, empty space between nose tip and wall behind, projector type, Visual Acuity, vendor is free to choose the projector-lens combination which satisfies above requirements	No change required

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			throw ratio should be 0.75:1 to 0.94:1 vari-focal lens		
5	Chapter - 4,Page no 50,Point-09	Soft Blending-Soft blending shall be applied on the blend zone to compensate for residual non-uniformity	<ul style="list-style-type: none"> <li>• Projector Geometry, Calibration, Blending and Warping in a Single Suite.</li> <li>•The software application should support camera based Calibration for Multiple projections.</li> <li>•The Software should support both Manual re-calibration and Camera based Auto re-calibration.</li> <li>•Should support Multiple Clustered Image Generators with master / client configuration and blending.</li> <li>•The software should integrate warping and blending with third party applications.</li> <li>•Should support GPU based Warping on NVIDIA Quadro.</li> </ul>	Blending software is not in the scope of this tender. However, vendor has to make markings on the screen every 10 deg for the FOV range	Soft Blending-Soft blending shall be applied on the blend zone to compensate for residual non-uniformity. Vendor shall make markings on the screen every 10 deg for the FOV range

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			<ul style="list-style-type: none"> <li>•On screen live masking should be available.</li> <li>•Should support and can be integrated with Unreal Engine &amp; Unity 3D.</li> <li>•The camera for calibration should be C-mount, CMOS sensor, GigE RJ45 interface with 4 MP (2048x2048) or better"</li> </ul>		
6		Provide Floor to cockpit nose tip height		Additional data provided to bidders	Floor to cockpit nose tip height dimension is 1573 mm Ground to DEP : 2730 mm Ground to FRL : 2230 mm
7	Chapter 4.2.2 (i)	Image Generators (IGs) will be provided by NAL. Each IG will have high end GPU with DP/DVI interface.			Image Generators (IGs) will be provided by NAL. Each IG will have high end GPU with DP/HDMI interface.

