

Addendum 01

The Pre – Bid Meeting was held on **03/06 /2019** at **12.00 Noon** through video conference in **Board Room**, NITK Surathkal for the purchase of “**3D PIV with LDV/PDPA System**” (Tender Notification No : **NITK/CRF/3D PIV/04** Dated: **12/05/2020**). The following queries were discussed & the Reply/Clarification given to the prospective bidders.

Queries & Reply/Clarification

SI. No.	NITK Tender Specifications	Questions asked by the vendor	Reply/ Clarification	Changes to the Tender
1	PIV laser with the most efficient compact monolithic dual cavity laser heads and it is optimized for PIV applications. The output energy $\geq 1\text{KHz @ } 527\text{nm}$ is $2 \times 20\text{mJ}$. The repetition rate can be changed from Single shot to 10 KHz and the laser is characterized by an excellent pulse to pulse stability and a uniform beam profile. Laser Class 4, according to EN60825-10:2001-11.	<p>1. Make it generic with following recommended specifications: Dual Cavity laser for PIV: $2\text{X}20 \text{ mJ @}1\text{kHz}$, 527nm. Repetition rates of up to 10 kHz Class 4 Laser</p> <p>2. PIV laser with the most efficient compact monolithic dual cavity laser heads and it is optimized for PIV applications. The output energy $\geq 1\text{KHz @ } 527\text{nm}$ is $2 \times \underline{30 \text{ mJ}}$ 20mJ. The repetition rate can be changed from single shot to 5KHz(or better) and the laser is characterized by an excellent pulse to pulse stability and a uniform beam profile. Laser class 4.</p>	Due to our application, we retain the repetition rate as it is. Whereas the energy is changed from 20mJ to 22.5mJ	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, SI. No. 01, Page No. 30 of 39, Under PIV lasers and other accessories, under 1.1 Specifications of the laser unit,</p> <p>NITK decided to modify it as</p> <p>“PIV laser with the most efficient compact monolithic dual cavity laser heads and it is optimized for PIV applications. The output energy $\geq 1\text{KHz @ } 527\text{nm}$ is $2 \times \underline{22.5 \text{ mJ}}$. The repetition rate can be changed from Single shot to 10 KHz and the laser is characterized by an excellent pulse to pulse stability and a uniform beam profile. Laser Class 4”.</p>
2	Beam Divergence: $8.0 \pm 15\%$ mrad or better	Beam Divergence: $< 3 \text{ mrad}$ or better	We retain the same specification	No changes

3	Beam circularity parameters M2x and M2y: 11 and 7 or better	Remove this. Beam circularity parameters M2x and M2y: 12 and 7 or better does not provide any information for getting better results.	We retain the specification	No changes
4	Ambient Temperature Range: 5-35°C or better	Ambient Temperature Range: 5-30°C or better	No changes	No changes
5	The compact volume illumination optics should be able to create a divergent light bundle for volume illumination, output aperture adjustable 15mm x 15mm to 150mm x 150mm, aspect ratios from 1:2 to 1:8 can be achieved.	And we are already quoting light sheet optics which are suitable for volumetric illumination. Please mention only "Area to be illuminated is 15mm x 15mm to 150mm x 150mm".	We retain our specification as it is. Hence, no changes in our specification.	No changes
6	3D Shadowgraphy diffused backlight (appropriate colour) illumination from Laser source: to split the laser into three passes and generate three backlight illuminations for each camera include:	Please mention what data output is required from 3D Shadowgraphy. 2D shadowgraphy output can provide similar information what 3D system can generate.	As 3D shadowgraphy is required for some of our applications we retain the same.	No changes.
7	Telescope Optics: to use a laser guiding arm with a Photonics DM laser	Remove only laser company name. (Remove completely redundant)	Due to redundancy, this point is removed from the specification	<p>NTK decided to remove this point from the tender specifications.</p> <p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 01, Page No. 31 of 39, Under point No. 1.3.1,</p> <p>"Telescope Optics: to use a laser guiding arm with a Photonics DM</p>

				laser” has removed from the specification.
8	High Speed Camera: 3 Nos	Dantec has suggested 4 camera system for getting desired result in the volumetric accessories. This is to achieve good seeding density and results inside the volume.	We require only 3 numbers of high speed camera	No changes.
9	High quality camera lens with appropriate mounts that are compatible with the high speed cameras: 45mm F/2.8, 85mm F/2.8, 100mm F/2.8, 50mm F/1.8, 135mm F/2.0.	<ol style="list-style-type: none"> 35mm F/2 instead of 45mm F/1.2. Getting 45mm and 50 mm lense does not bring any great change in data acquisition. Please Remove 85mm F/2.8 as 100 mm F/2.8 is already covering this range Mention each each 3 Nos 	The suggestion from the vendor is considered and changes have been made in the camera lenses.	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 02, Page No. 31 of 39, Under High Speed Camera, under 2.2 Accessories for high speed camera,</p> <p>NITK decided to modify it as</p> <p>“High quality camera lens with appropriate mounts that are compatible with the high speed cameras: 35mm F/2.8, 50mm F/2.8, 85mm F/2.8, 100mm F/1.8, 135mm F/2.0 (Each 3 Nos)”</p>
10	F-mount High magnification lens for both working distance 140-190mm & 400-900mm.	<ol style="list-style-type: none"> Please mention Long Distance Microscope with this term. Mention each 1 no 	This is the standard one. So, we retain the same specification.	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 02, Page No. 31 of 39, Under High Speed Camera, under 2.2 Accessories for high speed camera,</p> <p>NITK decided to modify it as</p> <p>“F-mount High magnification lens for both working distance 140-190mm & 400-900mm (each 1 no)”.</p>
11	2.3.1 For 2 linear units, consisting of: Controller for 2	1. Mention General Specifications-Like 2D traversing unit with	The suggestion from the vendor is accepted.	NITK decided to modify it as

	<p>axes, mounting plates, Software controlled table version</p> <p>2.3.2 Linear Unit (Qty 3): max. travel distance 1000 mm, ball screw pitch 2.5 mm, including direct drive module</p>	<p>controller . Travel ranges 1000mm or more in both directions with minimum incremental motion is microns Traverse should be able to control through supplied PIV software. Traverse should be supplied with all the required accessories for camera mounting.</p> <p>2. Traverse specifications. 2 Axes. Suggested 3 axes</p> <p>3. Linear unit(Qty 2): max travel distance 1000mm, ball screw pitch 2.5mm, including direct drive module</p>		<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 02, Page No. 31 of 39, Under High Speed Camera, under 2.3 Translation Unit, Point no: 2.3.1. & 2.3.2 may be read as:</p> <p>“2D traversing units with controller in both the directions with minimum incremental motion in microns with max. travel distance of 1000 mm, or more. Traverse should be controlled through PIV software. Traverse should be supplied with all the required accessories for camera mounting. (Qty 2 nos)”</p>
<p>12</p>	<p>Mounting accessories: includes 1000mm X95 profile (Qty 3), X95 carriers (Qty 3)</p>	<p>1. The suitable mounting accessories can be supplied for volumetric PIV camera mountings along with traversing system.</p> <p>2. Mounting accessories: includes 1000mm and appropriate connectors</p>	<p>The suggestion is considered.</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 02, Page No. 32 of 39, Under High Speed Camera, under 2.3 Translation Unit, Point no: 2.3.3.,</p> <p>NITK decided to modify it as</p> <p>“Mounting accessories: includes 1000mm X95 profile (Qty 1), X95 carriers (Qty 3). 12 kg gear heads (Qty 3)”.</p>
<p>13</p>	<p>Scheimpflug adapters (Qty 3): Max. Scheimpflug angle up to 20°, free orientation of the</p>	<p>We can provide better solutions. The scheilflug adaptor keeps the field of view unaffected by rotating the</p>	<p>Suggestion considered</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No.</p>

	camera for oblique Scheimpflug angles, Scheimpflug rotation axis aligned with camera	camera rather than the lens. Angle adjustment range is $\pm 15^\circ$ which is 30° in total.		02, Page No. 32 of 39, Under High Speed Camera, Point no: 2.3.4. NITK decided to modify it as “Scheimpflug adapters (Qty 3): Max. Scheimpflug angle up to 30°. Free orientation of the camera for oblique angles and Scheimpflug rotation axis aligned with camera”.
14	Square Rail System (Qty 1): Based on X95 profiles for Volumetric PIV systems which includes 3 gear heads	The suitable mounting accessories can be supplied for volumetric PIV camera mountings along with traversing system.	NITK decided to remove the specification	Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 02, Page No. 32 of 39, Under High Speed Camera, Under Translation Unit: The Point No: 2.3.5 is removed from the tender specification
15	Appropriate Backlight blue LED illumination (Qty 1):	Please mention” Appropriate LED illumination”. We have listed the better LED specifications	We would like to perform simultaneous measurements on PIV and shadowgraphy. In this aspect, white LED is not appropriate.	No changes.
16	Instantaneous recording of a 3D-3C vectorfield (3 dimensions, 3 velocity components) within a volume, up to 1 million vectors per volume, includes calibration routines	Vectors are calculated based on the Interrogation window and particle cross co-relation. 1 million vectors can be generated only by interpolation method if sufficient information from experiments are not available. These are nothing but replacement of actual vectors calculated which provides true information.	The recommendation is considered and for more clarity, the specification is now modified.	Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 03, Page No. 32 of 39, Under Software for 3D PIV, Stereo PIV, Volumetric PIV and cameras, Under 3.4 Software module for volumetric PIV NITK decided to modify it as

				<p>“Instantaneous recording of a 3D-3C vectorfield (3 dimensions, 3 velocity components). The software should be able to capture up to 0.2PPP in cubic volume”.</p>
17	Helium soap filled bubble generator of approximately 300 microns.- 1unit	<ol style="list-style-type: none"> 1. We can supply suitable seeding generators for Air Applications. Helium soap filled bubble generaor are used in high speed and higher field of view PIV experiments e.g. Large walkable wind tunnels. We can provide suitable fog generators and seeding particles for Air PIV applications. Change it to “Suitable seeding and fog generators for Air Applications. 2. Please do include the information on the Controller for the generator, Nozzle set (say minimum 20 nozzles), Base profile to hold the nozzles. Controller 3. Helium/air filled soap bubble generator of approximately 15 micron or better 	We wish to have helium soap bubble generator, if not hydrogen is also fine with ≥ 200 microns with 20 nos of nozzles and appropriate controller.	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, Sl. No. 03, Page No. 35 of 39, Under Supply of seeding/fluorescent particles and appropriate optical filters (common to both Module I and Module II), Under 4.2 Gas phase PIV experiments:</p> <p>NITK decided to modify it as</p> <p>“Helium soap or hydrogen filled bubble generator with microns ≥ 200 and 20 nos of nozzles and appropriate controller & accessories”</p>
18	Dye calibration cell for temperature measurement	Please change it as “Suitable in situ calibration to be provided.” Our calibration process is easy and simple.	Suggestion considered.	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module III, Sl. No. 02, Page No. 36 of 39, Under Liquid medium Concentration and temperature measurements, Under 4.2 Gas phase PIV experiments:</p>

				NITK decided to modify it as “Suitable in situ calibration for temperature measurement”.
19	<p>➤ The PC comprises: Dual Intel Xeon 22 Core CPU 2.1 and 3.7GHz Turbo 256GB RAM, 2TB M.2 Class 50 SSD Raid, For advanced Streaming capabilities up to 600MB/s 24TB Raid System for data, DVD -/+RW, NVidia 16GB, 2560CUDA cores, for High Performance GPU computation,</p>	<p>Computer 1: We do not offer dual core PCs, as they are not recommended for our applications. We recommend single processor with multi core System Computer. Intel Xeon W-3275 / 2.5 GHz Prozessor LGA3647, 2.5 GHz - 28 cores - 56 Threads, Supermicro CPU, Mainboard Supermicro X11SPA-T, LGA3647, 1200W FSP Fortron Netzteil, 256 GB DDR4 Ram 2666Mhz, 1 x Samsung 860 Pro SSD 512GB SATA, 1 x Samsung 970 Plus M.2 SSD 2TB, 2 GB Gigabyte Graphics card Nvidia Quadro P400, 8 x 4 TB 3.5" HDD Hot Swap, 8 Port Adaptec Hostcontroller, 8GB Graphics card NVidia Quadro P4000, LG DVD Brenner SATA, Logitech Mouse B100 optical with cable, Cherry Keyboard English, Windows 10 Pro for Workstation english.</p>	<p>Yes. We agree with the recommendation proposed by the vendor.</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 04, Page No. 33 of 39, Under High Performance Volumetric Imaging Workstation,</p> <p>NITK decided to modify it as “Single processor with multi core System Computer. Intel Xeon W-3275 / 2.5 GHz Prozessor LGA3647, 2.5 GHz - 28 cores - 56 Threads, Supermicro CPU, Mainboard Supermicro X11SPA-T, LGA3647, 1200W FSP Fortron Netzteil, 256 GB DDR4 Ram 2666Mhz, 1 x Samsung 860 Pro SSD 512GB SATA, 1 x Samsung 970 Plus M.2 SSD 2TB, 2 GB Gigabyte Graphics card Nvidia Quadro P400, 8 x 4 TB 3.5" HDD Hot Swap, 8 Port Adaptec Hostcontroller, 8GB Graphics card NVidia Quadro P4000, LG DVD Brenner SATA, Logitech Mouse B100 optical with cable, Cherry Keyboard English, Windows 10 Pro for Workstation english. GPU card connected through NVLink (1 No)”</p>
20	<p>• The PC comprises: Dual Intel Xeon Quadra Core CPU 4 and 4.5GHz Turbo 64 GB RAM,</p>	<p>Computer 2: Intel Core i9 9940X Processor (3.3GHz standard, 4.4GHz max) Supermicro Mainboard</p>	<p>Yes. We agree with the recommendation proposed by the vendor.</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No.</p>

	<p>512TB M.2 SSD Class 50 SSD Raid, For advanced Streaming capabilities up to 300MB/s8TB Raid System for data, DVD -/+RW, NVidia 16GB, 2560CUDA cores, for High Performance GPU computation</p>	<p>C9X299-PGF, 14 cores, 4 x 16 GB (64GB) DDR4 ECC 2666 MHz DIMM, 2 GB Gigabyte Graphics card Nvidia Quadro P400, 512 GB Samsung Pro SSD M.2, 4 x 4TB Sata WD Purple Hot Swap, 8 Port Adaptec Host controller, 8GB Graphics card NVidia Quadro P4000, LG DVD Brenner SATA, Logitech Mouse B100 optical with Kabel, Cherry English Keyboard, Windows 10 Pro for Workstation english.</p>		<p>04, Page No. 33 of 39, Under High Performance Imaging PC as a PIV analysis system,</p> <p>NITK decided to modify it as</p> <p>“Intel Core i9 9940X Processor (3.3GHz standard, 4.4GHz max) Supermicro Mainboard C9X299-PGF, 14 cores, 4 x 16 GB (64GB) DDR4 ECC 2666 MHz DIMM, 2 GB Gigabyte Graphics card Nvidia Quadro P400, 512 GB Samsung Pro SSD M.2, 4 x 4TB Sata WD Purple Hot Swap, 8 Port Adaptec Host controller, 8GB Graphics card NVidia Quadro P4000, LG DVD Brenner SATA, Logitech Mouse B100 optical with Kabel, Cherry English Keyboard, Windows 10 Pro for Workstation English (1 No)”</p>
<p>21</p>	<p>High performance Inverted Stereo Microscope for micro PIV</p> <p>➤ Type: Inverted Stereo microscope, motorised z axis for focus adjustment, 20x zoom, connections for two cameras, eyepieces, 100% switchable between eyepieces and cameras,</p>	<p>We can offer the offer the following motorized StereoMicroscope: Motorised z axis for focus adjustment, 20x zoom, connections for two cameras, eyepieces, 100% switchable between eyepieces and cameras, control of motorized focus function with external SYCOP touch screen system control panel and via software</p>	<p>Vendors suggestion is considered</p> <p>Under High performance Inverted Stereo Microscope for micro PIV</p> <p>From 1st bullet points to 6th bullet points, the specification is replaced as “Motorized StereoMicroscope: Motorised z axis for focus</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, Sl. No. 01, Page No. 34 of 39, Under High performance Inverted Stereo Microscope for micro PIV,</p> <p>NITK decided to modify it as</p> <p>“Motorized StereoMicroscope: Motorised z axis for focus adjustment, 20x zoom, connections for two cameras, eyepieces, 100% switchable</p>

<p>control of motorized focus function with external touch screen system control panel and via software</p> <ul style="list-style-type: none"> ➤ Complete solution for microfluidics, includes objectives ×10, bright field and fluorescence filter cubes, camera port for Fmount, ×10 eyepiece, halogen lamp, flexible optical guide and integrated laser safety package. ➤ Free working distance - 20mm standard, others up to 135mm on request ➤ Stereo full angle: ~62 degree (in air), ~46 degree (in water) ➤ The magnification can be changed continuously for flexibility or step-wise for repeatability. ➤ The microscope features fully plan apochromatic corrected optics, 16,5:1 zoom ratio, a double-iris diaphragm to control the field depth, an optional objective slider to switch to conventional 2D imaging 		<p>adjustment, 20x zoom, connections for two cameras, eyepieces, 100% switchable between eyepieces and cameras, control of motorized focus function with external SYCOP touch screen system control panel and via software”</p>	<p>between eyepieces and cameras, control of motorized focus function with external SYCOP touch screen system control panel and via software”</p>
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<p>22</p>	<p>Objectives:</p> <ul style="list-style-type: none"> • Objective lens ×5/0.12 WD = 14 mm • Objective lens ×20/0.40 corr. WD = 3.2-1.9mm • Objective lens ×40/0.55 corr. WD = 3.3-1.9mm • Objective lens ×63/0.70 corr. WD = 2.6-1.8 mm 	<p>for Stereo Microscope, Type: Achromat S 0.63x, Free working distance 107 mm</p> <p>for Stereo Microscope, Type: Apochromat S 0.3x, Free working distance 234 mm</p> <p>for Stereo Microscope, Type: Plan-Apochromat 1.5x, Free working distance 30 mm</p> <p>for Stereo Microscope, Type: Plan-Apochromat 1.0x, Free working distance 60 mm</p>	<p>Vendors recommendation is considered</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, Sl. No. 02, Page No. 35 of 39, Under Objectives:</p> <p>NITK decided to modify it as</p> <p>“Stereo Microscope, Type: Achromat S 0.63x, Free working distance 107 mm</p> <p>For Stereo Microscope, Type: Apochromat S 0.3x, Free working distance 234 mm</p> <p>For Stereo Microscope, Type: Plan-Apochromat 1.5x, Free working distance 30 mm</p> <p>For Stereo Microscope, Type: Plan-Apochromat 1.0x, Free working distance 60 mm”</p>
<p>23</p>	<p>Designed for 532 nm excitation, Fluorescence wavelength >= 545 nm</p>	<p>only in combination with coaxial illumination unit, designed for excitation with 527 nm, fluorescence wavelength >= 545 nm</p>	<p>Recommendation considered</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, Sl. No. 02, Page No. 35 of 39, Under Filter Cube Optics,</p> <p>NITK decided to modify it as</p> <p>“Designed for excitation with 527 nm, fluorescence wavelength >= 545 nm”</p>

<p>24</p>	<p>For coupling laser light of a laser into optical fiber with beam diameter ≤ 4 mm</p>	<p>Please add: for coupling laser light into optical fiber, for high speed lasers up to 220 W</p>	<p>Suggestion considered</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, Sl. No. 02, Page No. 35 of 39, Under Optics and Mounts,</p> <p>NITK decided to modify it as</p> <p>“For coupling laser light into optical fiber, for high speed lasers up to 220 W”</p>
<p>25</p>	<p>Laser guiding arm and accessories:</p>	<p>Please revise the heading to Laser guiding arm, light sheet optics and accessories (Laser feet, breadboard)</p>	<p>The title is now revised.</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 01, Page No. 30 of 39, Under 1.2 Accessories,</p> <p>“Laser guiding arm and accessories” may be read as “Laser guiding arm, light sheet optics and accessories”.</p>
<p>26</p>	<p>Combination of spherical and cylindrical lens with suitable divergence angles that generate parallel and divergent light sheet.</p>	<p>Combination of spherical and cylindrical lens with suitable divergence angles that generate collimated parallel (up to 100mm high) and divergent light sheet (with minimum 2 cylindrical lenses of divergence angles between 10-30°)</p>	<p>The specification is now revised.</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 01, Page No. 30 of 39, Under 1.2 Accessories,</p> <p>NITK decided to modify it as</p> <p>“Combination of spherical and cylindrical lens with suitable divergence angles that generate parallel and divergent light sheet.</p>

				Divergence angles between 10-30°.
27	The compact volume illumination optics should be able to create a divergent light bundle for volume illumination, output aperture adjustable 15mm x 15mm to 150mm x 150mm, aspect ratios from 1:2 to 1:8 can be achieved.	The compact volume illumination optics should be able to create a divergent (3-14°) light bundle for volume illumination. Output aperture cross section: Rectangular/Circular etc.	The specification given in the tender is retained as it is.	No changes.
28	Throughput: 6Gpx/sec or better	Throughput: 4Gpx/sec or better	The specification given in the tender is retained as it is.	Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 02, Under High Speed Camera, Under 2.1 Specifications of high-speed camera, NITK decided to modify it as “4Gpx/sec or better”
29	Wavelength typically 450 nm, FWHM 25 nm	Wavelength typically 528nm	Suggestion considered. well	Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 02, Page No. 32 of 39, Under 2.3.6 Appropriate Backlight blue LED illumination (Qty 1): NITK decided to modify it as “Wavelength typically 528nm, FWHM 25 nm”

<p>30</p>	<p>Installation of PIV software and drivers, frame grabber, timer or other boards included with the system, as well as test of the complete measurement system,</p>	<p>Remove frame grabber</p>	<p>Suggestion considered</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 04, Page No. 33 of 39, Under High Performance Volumetric Imaging Workstation</p> <p>NITK decided to modify it as</p> <p>“Installation of PIV software and drivers, timer or other boards included with the system, as well as test of the complete measurement system”</p>
<p>31</p>	<p>GPU for 3D LSM and SMART reconstructions</p>	<p>Compatible GPU hardware and software for faster processing</p>	<p>Suggestion considered.</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, Sl. No. 04, Page No. 33 of 39, Under High Performance Imaging PC as a PIV analysis system</p> <p>NITK decided to modify it as</p> <p>“Compatible GPU hardware and software for faster processing”</p>
<p>32</p>	<p>Calibration accessories for 2D and 3D</p>	<p>Automatic/Manual velocity calibrators with velocity range up to 140m/s.</p>	<p>This specification is removed.</p>	<p>Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module IV, Sl. No. 01, Page No. 36 of 39, Under 6 Channel Multichannel CTA Hot wire system,</p> <p>NITK decided to modify it as</p>

				The specification related to 6 Channel Multichannel CTA Hot wire system (including probes for air and water application) is being removed, but high speed camera is retained with revised specification.
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The following points need to be considered while quoting the bid.

1. Under **Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, Sl. No. 02, Page No. 35 of 39, Under Filter Cube Optics,**

“Designed for 532 nm excitation, Fluorescence wavelength ≥ 545 nm” may be read as **“Only in combination with coaxial illumination unit, designed for excitation with 527 nm, fluorescence wavelength ≥ 545 nm”**.

2. Under **Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, Sl. No. 02, Page No. 35 of 39, Under Optics And Mounts,**

“For coupling laser light of a laser into optical fiber with beam diameter ≤ 4 mm” may be read as **“For coupling laser light into optical fiber, for high speed lasers up to 220 W”**.

3. Under **Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, Sl. No. 02, Page No. 35 of 39, Under Optical Fiber,**

“2m length for laser” may be read as **“For High speed laser or cw laser, fiber length: 2 m, designed for visible wavelength range”**.

4. Under **Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, SI. No. 02, Page No. 35 of 39, Under Optics And Mounts,**

“for coupling laser light of a laser into optical fiber with beam diameter ≤ 4 mm” may be read as **“For coupling fiber for high speed lasers to stereo microscope with coaxial illuminator”**.

5. Under **Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, SI. No. 3, Page No. 36 of 39, under 4.3 Fluorescent PIV experiments,**

“The specifications under **small and portable devices** is being removed”.

6. Under **Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module IV, Page. No. 36 of 39**

The specification related to **6 Channel Multichannel CTA Hot wire system (including probes for air and water application)** is being removed, but high speed camera is retained.

7. Under **Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, SI. No. 02, Page No: 35 of 39**

The following specifications are removed:

- **Calibration module for Micro-PIV measurements**
- **micro-fluidics PIV starter kit**

8. Under **Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, SI. No. 01, Page No. 31 of 39, under 1.3.1**

- “Maintenance kit: for Photonics DM series laser, filters, corrosion inhibitor and desiccants” is replaced as **“Maintenance kit for the laser mentioned in Module I: filters, corrosion inhibitor and desiccants”**

- “Telescope Optics: to use a laser guiding arm with a Photonics DM laser” is replaced as **“Telescope Optics: to use a laser guiding arm with the laser”**

9. Under **Tender Document, Annexure-H**, under **Detailed Technical Specifications**, Under **Module I, SI. No. 01**, under **1.3 Volume illumination optics**:

“Suitable laser safety goggles (4 Nos)” may be read as **“Suitable laser safety goggles (5 Nos)”**

10. Under **Tender Document, Annexure-H**, under **Detailed Technical Specifications**, Under **Module II, SI No. 03, Page No. 36 of 39**, under **4.3 Fluorescent PIV experiments**, following point need to be included.

- **Double sided 3D calibration plate for 2D/Stereo/ Volumetric PIV measurement.**

11. Under **Tender Document, Annexure-H**, under **Detailed Technical Specifications**, Under **Module IV, Page No. 37 of 39**, under **SI. No. 02**, **For the high speed camera**, the following modifications have been done:

- “Technical Specifications: Sensor type: CMOS” may be read as **“Technical Specifications: Sensor type: Monochrome”**
- “Maximum Frame rate at full resolution: 2500 FPS@ 1MP (1280×864 pixels)” may be read as **“Maximum Frame rate at full resolution: 4,000 FPS or higher @ 1 Megapixel. More than 8,00,000 FPS at reduced resolution”**
- “Pixel size: 13.7 μm Square” may be read as **“Pixel Size (microns): 10 μm x 10 μm”**
- “Shutter Speed: 1 μs” may be read as **“Global Electronic Shutter: 1 μs”**
- “Memory: 8GB or better” may be read as **“Internal Recording Memory: 4 GB or better”**
- “Light Sensitivity: 6400 mono” may be read as **“Light Sensitivity: ISO 10,000 monochrome. Should be certified ISO 12232 Ssat Standard”**

- “Lens options C mount / FG mount” & “F mount and C mount” may be read as **“Appropriate C & F mount should be included.(replace lens and Fmount)”**
- “Bit depth: 10 bit” may be read as **“Dynamic Range (ADC): 12-bit monochrome”**

12. Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module IV, Page No. 37 of 39, under SI. No. 02, **For the high speed camera, following has been added:**

- **Quantum Efficiency: More than 60% at 630 nm.**
- **Adjustable Portable and foldable tribot stand ; Appropriate light source ; Appropriate Image processing Software; Black curtain-2 nos (10 m x 10 m) or higher.**

13. Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module II, SI. No. 02, Under Accessories,

“Test model: Microfluidic chip 20 mm x 40mm, channel width approx. 600 μm ” is replaced as **“The microfluidic starter set contains microchannel chip with 9 or more different microchannels, sampling vessels, appropriate connectors and tubings”**.

14. Under Tender Document, Annexure-H, under Detailed Technical Specifications, Under Module I, SI. No. 03, Page No. 32 of 39, Under 3.4 Software module for Pressure from PIV:

“calculates pressure fields from 2D-, Stereo-, Volumetric PIV. With standard 2D-, Stereo- or Volumetric PIV it should calculate average pressure data. With Time-resolved PIV data it should calculate both average and instantaneous pressure fields using the 4D Pressure Solver” may be read as **“calculates pressure fields from 2D-, Stereo-, Volumetric PIV. With standard 2D-, Stereo- or Volumetric PIV it should calculate average pressure data. With Time-resolved PIV data it should calculate both average and instantaneous pressure fields or using the 4D Pressure Solver”**

15. Under Tender Document, Annexure-H, under Detailed Technical Specifications, under Evaluation of the proposal, Page No. 38 of 39, Point No. 15:

“A suitable UPS with Inbuilt Isolation Transformer should be supplied” may be read as **“A suitable UPS for 1 hour backup with Inbuilt Isolation Transformer should be supplied”**

16. The following items need to be quoted along with equipment

1. Additionally the following computers are being procured

<p>2 no's x Intel Xeon Silver 4216 2.1GHz, 3.2GHz Turbo, 16C, 9.6GT/s 2UPI, 22MB Cache, HT (100W) DDR4-2400 upgradable to Scalable family CPUs with up to 28 cores per processor, Intel® C621 or higher, 96GB (6x16GB)2933MHz DDR4 RDIMM ECCmemory and upgradable up to Six channel memory up to 1.5TB 2933MHz DDR4 ECC memory 16DIMM Slots or higher, Windows 10 Professional for Workstations 4 Cores Plus and Ubuntu dual boot, Windows Logo: Windows 10 Professional Edition and Ubuntu,RHEL/SUSE Linux, 3.5" 2TB Solid state hard disk, Integrated Intel AHCI SATA chipset controller (8x 6.0Gb/s), SW RAID 0,1,5,10 or Equivalent or better, NVIDIA Quadro P4000, 8GB DDR5 RAM with 4 DP, 2 port 10 GbE Integrated WOL Wake on LAN, Front ports : Minimum 2 x USB 3.1 Gen1, 2 x USB 3.1 Gen1 Type C, 1 x Universal Audio Jack, Rear ports :Minimum 6 x USB 3.1 Gen1, 1 x Serial Port, 1 x Audio out/Headphones, 1 x Audio in/Mic In Jack, 2 x NIC Integrated RJ45 ,Dual PS2 Ports—Keyboard/Mouse, 8 no's –SATA @6Gb/s plus 1 SATA for optical, DVD+/-RW Internal, Slots: All slots PCIe Gen 3: (2) PCIe x16, (2) additional x16 slots with 2nd CPU; (1) PCIe x8 open ended, (1) x16 wired as x 4, (1) x16 wired as x1, compatible up to NVIDIA Quadro and AMD Radeon Pro graphics cards and future upgradable upto 750W with maximum of 3 x 250W double width graphics cards in 3 slots (dual CPU configuration) and up to 2 x 375W graphics cards. USB Multi Media Keyboard & USB Optical scroll Mouse (Same make as computer), Mini-tower with tool-less entry and maintenance with tool free disk mounting and tool free PCI card installation features , chassis should have integrated chassis handles, 24" monitor or above Viewable image size (diagonal) FHD IPS Backlight LED, 5years comprehensive Part, Labour, Onsite Next Business day by OEM with 24x7x365 remote hardware support for entire workstation,windows OS, monitor, KBD & Mouse, Trusted Platform Module (TPM 1.2); Intrusion switch; Setup/BIOS Password; I/O Interface Security; lock slot, Padlock ring, Internal bezel lock; lockable power supply, 900W or higher SMPS (input voltage 100VAC -240VAC) –90% or better efficient (80PLUS Gold Certified), AMT or vPro with DASH support. Workstation should have: remote access to the PC for management and security tasks, when an OS is down or PC power is off, 1no x External 5.25" bay and 1no x Slimline bay for ODD Support.</p>	<p>2 Nos</p>
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2. Additional Individual Analysis software Dongle (Qty 1 No) need to be quoted along with equipment.

3 The following specifications need to be included:

Optical table : 4 x 6 ft – 2 Nos

Optical table : 2 x 3 ft – 1 No

Wooden office table: Height x Width x Depth: 75 cm x 161 cm x 76 cm – 2 Nos (with storage included)

4 Dry box:

Capacity: 80 litres, Humidity range: 25-60%, Internal dim: 21.06x12.95x17.72 inches, Material: stainless steel box and tempered glass door. 1 No

5 A standard Godrej bero – 2 Nos (with 5 racks) WxH xD: 101.8 cm x 198 cm x 53.5 cm (3 ft 4 in x 6 ft 5 in x 1ft 9 in)

6 Computer tables – 6 Nos

7 Office chair for computer table – 8 Nos

8 Allen key set : 1No

9 Screw driver set: 1 No

10 Mono laser Printer (2Nos):

Cartridge Technology: Composite

Printing Technology: Laser

Type of Printing: Mono

Paper Size: A4

Print Speed per minute as per ISO/IEC 24734 in (A4) Size - Mono 27

Duplexing Feature

Wireless Connectivity: Wi-Fi

Number of Main Paper Trays 1

Bypass Tray Facility

11 15amps socket Extension socket – 6 nos, 5amps Extension socket - 20 nos

12 Additional notes:

1 Mandatory supporting documents such as brochure, literature and user list for the quoted 2D PIV, Stereo PIV & Tomo PIV (for both Micro & Macro system), BOS, Pressure from PIV, 2D & 3D Shadowgraphy system is requested. This is to ensure that prototypes are not being promised to be delivered.

- 2 Documentation to show the data treatment for 2D PIV, Stereo PIV & Tomo PIV (for both Micro & Macro system), BOS, Pressure from PIV, 2D & 3D Shadowgraphy : An appropriate data treatment is essential for the quality of the corresponding results obtained from the raw recorded data by the imaging system. Required is a documentation in detail of the data management & workflow for a) Data recording b) calibration procedure c) pre and post-processing steps d) visualization of results.
- 3 MUST provide the complete software manuals/Software screenshot for all the above techniques (as pdf files) with text description, tables, workflow charts etc. to prove the reliability and document the content of the corresponding software/packages as offered. Offers failing to provide the document evidence is liable to be rejected.

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