PUR/IICT/0758/24-25/EQPT

CORRIGENDUM -1

REVISED/AMENDED SPECIFICATIONS FOR SUPPLY of MATLAB SOFTWARE

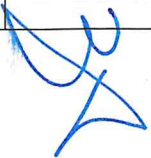The following corrigendum is issued to above mentioned tender for supply of "MATLAB SOFTWARE"

Revised Technical Specification/Complete Specifications

ANNEXURE-1

**The supplied software should have the following features:**

S.No	Toolbox Type	Qty	Key Features
1.	**MATLAB**	1	Should have following features: • High-level language for scientific and engineering computing • Desktop environment tuned for iterative exploration, design, and problem-solving • Graphics for visualizing data and tools for creating custom plots • Apps for curve fitting, data classification, signal analysis, control system tuning, and many other tasks • Add-on toolboxes for a wide range of engineering and scientific applications • Tools for building applications with custom user interfaces • Interfaces to C/C++, Java, .NET, Python, SQL, Hadoop, and Microsoft Excel • Royalty-free deployment options for sharing MATLAB programs with end users
2.	**Deep Learning Toolbox**	3	**Design, train, and analyze deep learning networks** • This Toolbox should provide a framework for designing and implementing deep neural networks with algorithms, pretrained models, and apps. You can use convolutional neural networks (ConvNets, CNNs) and long short-term memory (LSTM) networks to perform classification and regression on image, time-series, and text data. You can build network architectures such as generative adversarial networks (GANs) and Siamese networks using automatic differentiation, custom training loops, and shared weights. With the Deep Network Designer app, you can design, analyze, and train networks graphically. The Experiment Manager app helps you manage multiple deep learning experiments, keep track of training parameters, analyze results, and compare code from different experiments. You can visualize layer activations and graphically monitor training progress. • Provision for import networks and layer graphics from TensorFlow2, TensorFlow-Keras, and PyTorch, the ONNX (Open Neural Network Exchange) model format, and Caffe. Also export provision for Deep Learning Toolbox networks and layer graphs to TensorFlow 2 and the ONNX model format. The toolbox supports transfer learning with DarkNet-53, ResNet-50, NASNet, SqueezeNet and many other pretrained models.

3.	**Global Optimization Toolbox**	3	**Solve multiple maxima, multiple minima, and nonsmooth optimization problems** • This Toolbox should provide functions that search for global solutions to problems that contain multiple maxima or minima. Toolbox solvers should include surrogate, pattern search, genetic algorithm, particle swarm, simulated annealing, multistart, and global search. Should be able to use these solvers for optimization problems where the objective or constraint function is continuous, discontinuous, stochastic, does not possess derivatives, or includes simulations or black-box functions. For problems with multiple objectives, it should have a provision for identifying a Pareto front using genetic algorithm or pattern search solvers. • Toolbox should be able to improve solver effectiveness by adjusting options and, for applicable solvers, customizing creation, update, and search functions. Should be able to handle custom data types with the genetic algorithm and simulated annealing solvers to represent problems not easily expressed with standard data types.
4.	**Optimization Toolbox**	3	• Should provide functions for finding parameters that minimize or maximize objectives while satisfying constraints. The toolbox should include solvers for linear programming (LP), mixed-integer linear programming (MILP), quadratic programming (QP), second-order cone programming (SOCP), nonlinear programming (NLP), constrained linear least squares, nonlinear least squares, and nonlinear equations. • Should have a provision of defining custom optimization problem with functions and matrices or by specifying variable expressions that reflect the underlying mathematics, and should have a provision of automatic differentiation of objective and constraint functions for faster and more accurate solutions. • Should be able to use the toolbox solvers to find optimal solutions to continuous and discrete problems, perform tradeoff analyses, and incorporate optimization methods into algorithms and applications. Should be able to perform design optimization tasks, including parameter estimation, component selection, and parameter tuning. It should enables user to find optimal solutions in applications such as portfolio optimization, energy management and trading, and production planning.
5.	**Statistics and Machine Learning Toolbox**	3	**Analyze and model data using statistics and machine learning** • This Toolbox should provide functions and apps to describe, analyze, and model data. Should be able to use descriptive statistics, visualizations, and clustering for exploratory data analysis, fit probability distributions to data, generate random numbers for Monte Carlo simulations, and perform hypothesis tests. Regression and classification algorithms let users to draw inferences from data and build predictive models either interactively, using the Classification and Regression Learner apps, or programmatically, using AutoML. • For multidimensional data analysis and feature extraction, the toolbox should provide principal component analysis (PCA), regularization, dimensionality reduction, and feature selection methods that let you identify variables with the best predictive power. • The toolbox should provide supervised, semi-supervised and unsupervised machine learning algorithms, including support vector machines (SVMs), boosted decision trees, k-means, and other clustering methods. This toolbox should be able to apply interpretability techniques such as partial dependence plots and LIME, and automatically generate C/C++ code for embedded deployment.

6.	**Image Acquisition Toolbox**	1	**Acquire images and video from industry-standard hardware** • This Toolbox should provide functions and blocks for connecting cameras to MATLAB and Simulink. It includes a MATLAB app that lets you interactively detect and configure hardware properties. You can then generate equivalent MATLAB code to automate your acquisition in future sessions. The toolbox enables acquisition modes such as processing in-the-loop, hardware triggering, background acquisition, and synchronizing acquisition across multiple devices. • This Toolbox mujstsupport all major standards and hardware vendors, including USB3 Vision, GigE Vision, and GenICamGenTL. You can connect to machine vision cameras and frame grabbers, as well as high-end scientific and industrial devices.
7.	**Image Processing Toolbox**	1	**Perform image processing, visualization, and analysis** • This Toolbox should provide a comprehensive set of reference-standard algorithms and workflow apps for image processing, analysis, visualization, and algorithm development. You can perform image segmentation, image enhancement, noise reduction, geometric transformations, and image registration using deep learning and traditional image processing techniques. The toolbox supports processing of 2D, 3D, and arbitrarily large images. • This Toolbox should let the user automate common image processing workflows. You can interactively segment image data, compare image registration techniques, and batch-process large datasets. Visualization functions and apps let you explore images, 3D volumes, and videos; adjust contrast; create histograms; and manipulate regions of interest (ROIs). • Users should be able to accelerate algorithms by running them on multicore processors and GPUs.
8.	**Computer Vision Toolbox**	1	**Design and test computer vision, 3D vision, and video processing systems** • This Toolbox should provide algorithms, functions, and apps for designing and testing computer vision, 3D vision, and video processing systems. Users should be able to perform object detection and tracking, as well as feature detection, extraction, and matching. Users should be able to automate calibration workflows for single, stereo, and fisheye cameras. For 3D vision, the toolbox supports visual and point cloud SLAM, stereo vision, structure from motion, and point cloud processing. Computer vision apps automate ground truth labeling and camera calibration workflows. • Users should be able to train custom object detectors using deep learning and machine learning algorithms such as YOLO v2, SSD, and ACF. For semantic and instance segmentation, you can use deep learning algorithms such as U-Net and Mask R-CNN. The toolbox should provide object detection and segmentation algorithms for analyzing images that are too large to fit into memory. Pretrained models let users detect faces, pedestrians, and other common objects. • Toolbox algorithms should support C/C++ code generation for integrating with existing code, desktop prototyping, and embedded vision system deployment.
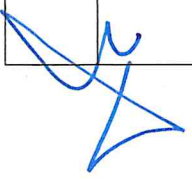
Upgradation for Matlab Software and add-on toolboxes for Licence Number 41000160, 41078938, 41113465 and 41113466 till October 2027 (3-Years)

The following are the details of existing MATLAB toolboxes& Licenses and their existing AMC tenure and required AMC tenure.

S.No	License No	Tool box	Qty	Existing AMC Tenure	Required AMC Tenure
1	41113466, 41113465, 41000160, 41078938	MATLAB	4	30 Sep 2023, 28 Feb 2025, 28 Feb 2025, 31 Mar 2022	Upto October 2027
2	41113465, 41000160	Deep Learning Toolbox	2	28 Feb 2025, 28 Feb 2025	Upto October 2027
3	41113465, 41000160	Global Optimization Toolbox	2	28 Feb 2025, 28 Feb 2025	Upto October 2027
4	41113465, 41000160	Optimization Toolbox	2	28 Feb 2025, 28 Feb 2025	Upto October 2027
5	41113465, 41000160	Statistics and Machine Learning Toolbox	2	28 Feb 2025, 28 Feb 2025	Upto October 2027

The last date for submission of Bid is being extended up to **09.12.2024 (1300 Hrs)** and the Date of opening is **10.12.2024 (1430 Hrs)**

Bidders may please take note of the above changes and submit their quotations accordingly.

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