ANNEXURE I

ANNEXURE B

SPECIFICATION:

“MSC.Software GmbH OR SIMILAR/EQUIVALENT” SOFTWARE LICENSE AVAILABILITY AND DATA MANAGEMENT INCLUDING THE PROVISION OF SOFTWARE MAINTENANCE AND SUPPORT FOR ENGINEERING SOFTWARE REQUESTED BY TRANSNET ENGINEERING

REVISION 0

DATE RELEASED

(21 June 2023)

Note: If there is no red “CONTROL COPY” stamp in the bottom right hand corner of this page, then this is an uncontrolled copy and should be used with caution.

CHANGE CONTROL

Control	Name and Designation	Signature	Date
Subject Matter Expert & Compiled	Thabo Modiba (Structural Mechanics Specialist) Bongani Mashaba (Senior Engineer)		23 June 2023 23 June 2023
Reviewed & Approval	Ngoako Obed Pitsi (Senior Manager (Act) - Design)		26 June 2023
Supply Chain Management: Governance Compliance Approval			

LIST OF REVISIONS

Rev	Date	Responsible person	Description	Classification

DISTRIBUTION LIST

EXTERNAL:	
All tenderers	

INTERNAL:	
Position	Encumbent
Chief Engineer: ESE	Danie.Nieuwoudt@transnet.net
Specialist: Engineering IT	Michael.coston@transnet.net
Specification Compiler	Bongani.Mashaba@transnet.net Thabo.Modiba@transnet.net
Specification Subject Matter Expert	Bongani.Mashaba@transnet.net NgoakoObed.Pitsi@transnet.net
Supply Chain Management: Procurement Manager	Siphokazi.Magubasi@transnet.net
Supply Chain Management: Procurement Officer	Pieter.Wentzel@transnet.net

TABLE OF CONTENTS

1.0. PURPOSE

Transnet Engineering (TE) seeks that the following be provided, either by the principal software developer or an authorized local reseller appointed by the respective principal software developer;

- Software license availability and data management for the requested engineering software including the provision of annual Software Maintenance and Support.

2.0. REQUIREMENTS

2.1. Description of Required Software Package availability

A description of the software package appears under Appendix A.

2.2. Annual Software Maintenance and Support

The requirements for annual Software Maintenance and Support are detailed under Appendix B.

3.0. APPENDICES

APPENDIX A: DESCRIPTION OF THE REQUIRED ENGINEERING SOFTWARE:

NAME OF CURRENT SOFTWARE:	MSC.Software GmbH
Please note that any equivalent or similar software product may be offered to comply with this tender	

DESCRIPTION OF SOFTWARE REQUIREMENTS:

Software packages must be licensed to have the capability, functionality and benefits as required and specified below:

Supplier Status

1. Document from principal software developer confirming if the tenderer is a "Principal Software Developer" / "Sole Distributor" / "Approved Reseller":

   - It is **mandatory** that a document confirming that the tenderer is the principal software developer or authorised by the principal software developer as a sole distributor/approved reseller for South Africa for all the proposed software is submitted with the tender. In the case of an authorised sole distributor/approved reseller, the document must also clearly state if authorisation is renewable and if so, the next renewal date as well as associated period of authorisation must be indicated.

Engineering Software Requirements

2. All proposed software must comply to similar/equivalent technical capability, functionality and benefits of the existing software as utilised in Transnet Engineering

- Tenderers must provide documented evidence that the proposed software has similar /equivalent technical capability, functionality and benefits of the existing software as utilised in Transnet Engineering. (This includes similar/equivalent standard features, embedded and special functionalities). Key requirements are listed as follow:

Number	Key technical capability, functionality and benefits utilised in Transnet Engineering
1	**Linear structural analysis (MSC Nastran, Patran and MSC Apex)** • Linear Statics, Normal Modes and Buckling
2	**NonLinear structural analysis (MSC Nastran, Patran, Marc and Mentat)** • Large Strain, Large Displacement, Nonlinear Materials, Damage and Failure, Buckling, and Prestress.
3	**Structural dynamics (MSC Nastran, Patran)** • Direct or Modal Frequency Response, Direct or Modal Transient Response, Direct or Modal Complex Eigenvalues, Linear or Nonlinear Transient and Random Analysis.
4	**Explicit Nonlinear Analysis (Dytran)** • Crash, Drop Test, & Impact, Fluid Structure Interaction.
5	**Implicit Nonlinear Analysis (Marc and Mentat)** • Dynamic Collapse of a Structure, Bolt Modelling, Interference Fit
6	**Optimization (MSC Nastran, Patran** • Topology, and Multi Model Optimization.
7	**Assembly (MSC Nastran, Patran and MSC Apex)** • Linear Contact, Nonlinear Contact, Glued Contact, Rigid Body Contact, Nonlinearities (Friction, Gap, etc.), Bolt Modelling, Spot Welds, Seam Welds and Gaskets.
8	**Multibody Dynamics (Adams)** • Quasi-Static Analysis, Kinematic Analysis, Transient Analysis, Nonlinearities, Linear Analysis, Vibration , Rigid Body, Rigid Body Contact, Import Meshing for Flexible Parts, Linear Flexible Body, Geometric Nonlinear Flexible Body, Material Nonlinear Flexible Body, Flexible Body, Flexible Body Contact, Clearance Analysis, Stress Recovery, Durability, Controls, Mechanism Plant Generation, MBD-Nonlinear Co-Simulation, Vehicle Dynamics (Rail, etc.).
9	**Pre-Processing (Patran and MSC Apex)**

	• Solid Modelling, Geometry Import, Geometry Clean-Up and Simplifications, Geometry Defeaturing, Topology Diagnosis, Mid-Surface Extraction, Automatic Surface Meshing, Free Surfacing Meshing, Mesh-based Surface Meshing, Mesh Quality Check and Repair, Assembly Check and Repair, Analysis Readiness and Solver Validation, Structured Hex Meshing, Mesh Morphing, Field Dependent Boundary Conditions, CFD or Thermal Mapping Loads, Parameterization, Scripting, Template Methods, Interface Customization and Export to Third-Party Solvers. Local Adaptive Mesh Refinement. Global Adaptive Meshing
10	**Post-Processing (Patran)** • Contour Displays, Vector Displays, Isosurface Displays, Animations, X-Y Charts, Result Data Probes, Multi-files Attachment, Automatic Report Generation and Import Results from Third Party Solvers.
11	**Welding Simulation Process (Simufact Welding)** • Modeling elastic-plastic behavior of materials, and structural welding simulation for different welding processes. identify critical distortions, i.e. with respect to assembly. Identify optimal welding directions and welding sequences. Investigate the influence of unclamping on welding distortions and residual stresses. Gain knowledge about the development of the heat affected zone.
12	**Cradle scFlow, Cradle scPOST** • Discrete Element Modeling, **Romax (Enduro, Energy, Evolve, Spin, Spectrum, Concept)** • Electro-mechanical drive systems (Concept Design, Durability and Structures, NVH simulation from gear and electric machine design).
13	**CAE Fatigue** • The Fatigue software interface should be simpler and intuitive to use and be embedded with process flow graphical-based interface. The software should Include a full training library. The software package should allow the user to calculate static and dynamic time domain durability for welded structures and provide fatigue life and damage predictions. Multi Input Loading, Multiple Output Options, Very Large Models, Sine Sweep (SINESW) , SN/EN Material Property, Equivalent Stress Correction, Mean Stress Correction, Plasticity Index, Damage Sensitivity, Frequency Response, Random Response, Event Repeats, Response Notch, Hotspot/Filter, Spot/Seam/User

	Welds, Factor of Safety, Multi Axial Assessment, Pseudo Damage, Rain flow Cycle Counting, Digital Signal Processing, Robust Design
14	**Data Management** • Web-based Simulation Process and Data Management system that manages all aspects of CAE simulation. Data navigation, visualization, access control, authentication, version control, and data comparisons.
15	**MSC Learning Center** • Access to all training curriculums for all the software the vendor provides. The courses should be made up of several modules, each module contains lectures, demos, audio from subject-matter experts, and workshops. Provide Certification Exams for the available modules within their e-learning centers/platform.
16	**MSC CoSim (or Alternative, Software must be able to communicate with each other)** • MSC CoSim scFLOW Interface • MSC CoSim Adams Interface • MSC CoSim MSC Nastran Interface

- The existing software modules as identified by the original software developer as well as the quantities currently in use at Transnet are listed as follow:

Number	Original Software Developer Identification	Quantity
1	MSC One tokens	230

Installation and Proficiency Timelines

3. Timelines for the complete installation of proposed software:

- Tenderers must provide an accurate and detailed project plan detailing the steps and timelines for the complete installation of the proposed software (This applies to both software upgrades as well as alternative software). The plan must be submitted as a hard copy. The format of the project plan must be the MS Project default option or similar.

4. Proficiency of users between current software and proposed software:

- Tenderers must provide a detailed project plan which they will execute to assist in the proficiency of the existing users of the current software, on the proposed software. The plan must be submitted as a hard copy. The format of the project plan must be the MS Project default option or similar.

System Infrastructure and Configuration

5. System infrastructure required by Transnet:

- As part of this tender submission, it is **mandatory** that tenderers provide Transnet with a comprehensive system requirement document detailing the hardware and licensing architecture requirements for the software to operate efficiently.

6. Central server software systems for multiple user installations:

- Tenderers must provide documented evidence that software can be stored on a central server and then installed and identically configured onto various machines countrywide in order to ensure software configuration uniformity across Transnet.

7. Data management and control systems required by Transnet:

- As part of this tender submission, it is **mandatory** that tenderers provide Transnet with a comprehensive systems requirements document for the software data storage and control systems detailing hardware and architecture requirements for the data systems to operate efficiently. Tenderers must provide two separate documents where one document details systems where Transnet is the custodian which owns, controls, manages and maintain the system and another where the principal software developer or their authorised agent is

the custodian which owns, controls, manages and maintains the system. Please note that this is an option which Transnet reserves the right to accept or decline.

Software Dependencies

8. Independent or Dependent software:

- It is **mandatory** that tenderers must provide Transnet with documented details of whether the proposed software operates as independent/stand-alone software, or whether the proposed software is dependent on the availability of additional software from a different principal software developer in order to be operational.

9. Dependent software requirements from Transnet:

- If additional software from a different principal software developer is required in order for the dependent software to operate, the tenderer must provide documentation which clearly states whether Transnet will be required to acquire the additional software, or whether the additional software is "embedded" and thus provided and licensed by the principal software developer. Transnet prefers not to approach the market for additional software.

Legacy Data Migration

10. Migration of current software data format, storage and control system to proposed software data format, storage and control system:

- Tenderer to provide evidence by way of a physical technical demonstration that the proposed software can import/access, transform, process, store and ultimately continuously utilize legacy software data without compromising any current data integrity. Should the proposed software not be able migrate the data directly and successfully, an alternative method may be proposed. If it is

necessary that the data migration requires additional software from a different principal software developer in order for the legacy data to be migrated successfully, the tenderer must provide documentation which clearly states whether Transnet will be required to acquire the additional software in order to ensure successful and efficient data migration, or whether the additional software license/s will be provided and licensed by the tenderer/principal software developer. Existing Transnet data will be made available for this demonstration up to one calendar week before the demonstration is scheduled. The evaluation will be based on integrity of the data which has been migrated and the speed of the migration process. A second set of Transnet data which will be made available at the time of the demonstration must also be migrated during the demonstration as confirmation of the proposed method.

Software Technical Demonstration

11. Software Technology Demonstration to confirm technical and performance compliance of the proposed software:

- Tenderers must do a technical demonstration to confirm that the proposed software complies to the requirements of this technical specification. As a requirement the following must be demonstrated.

Number	Features to be Demonstrated
1	Linear structural analysis
2	Non linear structural analysis
3	Structural dynamics
4	Multibody Dynamics
5	Explicit Nonlinear Analysis
6	Welding Simulation Process
7	Electro-mechanical drive systems
8	Discrete Element Modeling
9	CAE Fatigue: Fatigue Assessment of welded structure.

Please note that any equivalent or similar software product may be offered to comply with this tender

APPENDIX B: ANNUAL SOFTWARE MAINTENANCE SUPPORT

DESCRIPTION OF ANNUAL SOFTWARE MAINTENANCE AND SUPPORT REQUIREMENTS:
Annual Software Maintenance and Support must as a minimum comply to the requirements specified below:

Software Maintenance and Support

1. All software packages must be provided with annual Software Maintenance Support to ensure that the subscription and perpetual software packages which are utilized by TE are:

   - continuously maintained for the period of the contracts to operate with the latest technical enhancements and software releases as released by the principal software developer;

     - i.e. timeously provided with notifications of minor and major upgrades.

     - i.e. provided with software version support timelines for upgrade planning.

   - continuously supported for the period of the contracts by timeously making available all the relevant and latest documentation which supports the latest technical enhancements and software releases;

   - continuously supported for the period of the contracts with the necessary end-user support from the approved and authorised local reseller and/or principal software developer. The required

Software Maintenance Support also includes 24/7 high-quality support (i.e., so-called Hot Line support) which must be responded to within 8 hours of notification advice during weekday business hours, should there be any problems which are experienced whilst users operate the software during the execution for their tasks. This on-site/off-site support includes as a minimum:

- Software and hardware configuration and installation assistance.
- License management tools which allows the installation, configuration, and uninstallation of licenses to suit the needs of Transnet Engineering.
- Software performance problem corrections.
- Software system problem resolution.
- Tier 2/3 support access from the principal software developer,
- All technical support personnel must be certified by the principal software developer.

Sample Software Maintenance and Support Specification

2. It is **mandatory** that a sample of the proposed annual Software Maintenance and Support specification, which encompasses the above as a minimum must be submitted as part of the tender submission to validate compliance and/or highlight exclusions.