NATIONAL INSTITUTE OF TECHNOLOGY
ROURKELA-769008 (ODISHA)
An Institute of National Importance under Ministry of Education, GOI

NOTICE INVITING TENDER

TENDER NOTICE NO:- NITR/PW/EE/2021/229 **Date: 27/01/2021**

The National Institute of Technology, Rourkela invites bids from the eligible bidder for procurement of **Opal-RT Real Time Simulator,** at Dept. of Electrical Engineering, NIT Rourkela.

Last date of submission of bid **: 17/02/2021 by 03:00 PM**

Date of opening of Techno-commercial & Financial bid **: 18/02/2021 at 03:00 PM**

Contact: Prof. Monalisa Pattnaik,
Department of Electrical Engineering,
National Institute of Technology,
Rourkela- 769008, Odisha
Ph:.0661-2462423
Email : pattnaikm@nitrkl.ac.in

Bidding through: https://eprocure.gov.in/eprocure/app

Sd/-
Registrar

NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA – 769 008, ODISHA

SINGLE TENDER NOTICE NO: NITR/PW/EE/2021/229 **Date: 27/01/2021**

Procurement of Opal-RT Real Time Simulator at NIT Rourkela

Sl. No.	Description of Goods/Services	Quantity
1.	**Opal-RT Real Time Simulator (As per the specification mentioned in Annexure II)**	**01 One)**

1. Quantity Required **:** As mentioned above (all information provided in Annexure II)
2. Delivery **:** Within **90 days** from the date of Purchase Order
3. Last Date of submission of Bid **: 17/02/2021 by 03:00 PM**
4. Opening of Techno-commercial & Financial Bid **: 18/02/2021 at 03:00 PM**
5. The firm should not have been black listed at any time.
6. The submission of following bids by the tenderer should be through http://eprocure.gov.in/eprocure/app Please follow the guidelines as per the portal

Procurement of Opal-RT Real Time Simulator at Department of Electrical Engineering , NIT Rourkela

SINGLE TENDER NOTICE NO: NITR/PW/EE/2021/229 **Date: 27/01/2021**

Due on 17/02/2021 at 03:00 PM

7. **Liquidated damage clause** will be charged for any delay in supply of goods
8. The validity of the tender shall be **90 days** from the date of opening of bids.
9. Detailed advertisement including all tender documents is also available in our website at http://nitrkl.ac.in/OldWebsite/Jobs Tenders/9Equipment/Default.aspx.
10. NIT reserves the right to qualify or deny prequalification of any or all applicant without assigning any reasons.

(REGISTRAR)

NIT, Rourkela
Fax No- 0661-2462022
Ph. No -0661-2462021

ANNEXURE-II

Detailed Technical Specification and Requirement

Technical Specifications- Opal RT Real Time Digital Simulator

Category	Technical Specifications
Processor, FPGA	Intel Xeon E3 CPU (4 core, 8MB cache, with 3.5GHz), 16G B RAM, 128 GB SSD Or Better FPGA: Kintex-7 FPGA, 325T, 326,000 logic cells, 840 DSP slice (Multiplier- adder) Or Better
Analog Input Channels	• 16-input channels • Resolution 16-bit ADC • 2.5 µs conversion time • ±20 V • All channels simultaneously captured/sampled • Reconfigurable Voltage Range • Short Circuit Protected • FPGA Based Control
Analog Output Channels	• 16-output channels • Resolution 16-bit ADC • 1µs conversion time • ±16 V • 10mA • All channels simultaneously captured/sampled • Short circuit protected • Reconfigurable Voltage Range • FPGA Based Control
Digital Input Channels	• 32 channels • Push pull type • 110 ns propagation delay • All inputs are sampled simultaneously • 4.5 V to 30 V, same module can be used up to 50 V • 3.5mA • Short circuit protected, Galvanic isolation with Opto coupler transition delay of 50 ns
Digital Output Channels	• 32 channels • Push pull type • 65ns propagation delay • 5 V to 30 V • Short circuit protected • Galvanic isolation • All outputs are simultaneously generated with a maximum transition delay of 65 ns • Same module should be used for PWM generation, software configurable
Connectivity	• Ethernet, USB,CAN, RS422
CAN Communication	• Number Channel : 4 • Interface : PCIe • Connectors : 26-Pin HD- Sub • Supports : high--speed CAN (ISO 11898-2) • Compatible : J1939, CAN open ,NMEA 2000 and Device Net • CAN- High and CAN Low : Should support • CAN FD : Should support • Isolation : Galvanically isolated CAN bus drivers
Embedded Mode operation	• Real Time Simulator should run in embedded mode option. ie. Once model is flashed on to the simulator it should run same model automatically without the involvement of the host computer even after rebooting the system. • It should be possible to erase and reprogram the flash for multiple times on the simulator • If user simulates inverter model in embedded mode, real time simulator should behave like an inverter. all the time even after rebooting until any other new model is flashed on real time simulator
Other required features	• Dedicated PWM generation with switching frequency up to 120 KHZ • Hardware in Loop (HIL), Rapid Control Prototyping (RCP) and Model in Loop Simulation Techniques/feature

	• Individual user should be able to connect through LAN • Should be capable of performing different applications like Power Electronics, Power System, Drives, and Controls etc. • Should facilitate Multi rate simulations • Should perform CPU + FPGA Co-simulation .ie a single model being simulated on CPU & FPGA at a same time in different time steps to facilitate complex power electronics and power system applications like Microgrid etc. • Should simulate Models on CPU with any step size between 1 Mili Seconds to 10 Microseconds and should simulate Models on FPGA with any Step size between 500 ns to 100 ns • Simulate Models Built in Matlab/Simulink/SimPowerSystems directly on Simulator Hardware and allow the Matlab/Simulink/SimPowerSystem models to interact with real world signals /hardware through Analog /Digital voltages and currents. • Real Time Operating System should be used dedicatedly for the real time simulation and RTOS should be COTS based.
Features & Capability of Software Modelling & Programing Environment	• Modelling & Programing environment should be MATLAB/Simulink/SimPowerSystems. • Any Other Proprietary/ Custom Developed Modelling Environment using DLL/ C /C++ code of MATLAB/Simulink/SimPowerSystems models is not accepted. • It Should Facilitate Integrated Development Environment Host software licenses across the lab allowing users to run simulations on a windows target in non-real time mode. • It should be capable of generating PWM pulses independent of simulation clock. • FPGA programming environment interface, for faster converter simulation & PE Simulations must be available. hence eliminating VHDL Coding or XSG Programing • It should support and be compatible with other Graphical Circuit Editor software like PLECS, PSIM, PSPICE, Multisim, etc. • Should have capability to interface with FEA tools like ANSYS/JMAG/Infolytica and simulate Motor models on FPGA and interface with the internal /external/simulated/physical controller • Models developed in SimPowerSystems/Sim Electrical for Power converter should be possible to run directly on the FPGA without VHDL/Verilog conversion • Models for easy learning of engineers in the field of Controls, Drives, and Power Systems & Power Electronics must be provided compatible to SimPowerSystems to get started with basic examples. • Should have provision for scripting language (e.g. Python). • It should be compatible with other Simulation software like LabVIEW, GT-Power, AMESim, TESIS • Modelling & programing environment should aid development of custom logic & algorithms used in advanced control schemes (e.g., C s-function). • Should support communication protocol like serial RS485 • It should have ability to edit parameters of the system during real time execution. • Automatic Core Allocation in cases of Multi-core simulation should be possible since this helps in minimizing time and effort spent to allocate cores manually • Simulate Power System Network like IEEE 14 Bus System, IEEE 39 bus System. • Simulate detailed Wind power plant using DFIG or PMSG • Simulate detailed model of multiple solar PV panels-based PV farm • Simulate various FACTS devices like SVC, TCSC, STATCOM, UPFC • Simulate CIGRE benchmark Multi-terminal LCC-HVDC • Send up to 16 CT/PT/CVT signals to actual protection relays, PMUs and other Intelligent Electronic Devices (IEDs) • Receive up to 32 status/command signals in the form of digital inputs from external controllers • Perform closed loop testing of low voltage protection relays for different contingencies in the power network • Simulate control algorithms for laboratory scale converters used in renewable energy Integration Studies. • Simulate control of wind energy systems using DFIG or PMSG • Control a wind turbine emulator system using DC motor setup • Control Physical converters for drives/ motors/power conversion applications/Microgrid/ Renewable Sources etc. • Simulate different control schemes associated with Solar PV inverters • Simulate & Validate control algorithms of Switched Mode Power Supply (SMPS) and UPS • Simulate control algorithms for under fault scenarios of electrical motor and converters • Simulate various types of faults like open-fault, short circuit, or gate-fault on any IGBT, Motor open line and line-line faults, DC links faults etc. • Simulate industrial controls for drives such as Direct Torque Control, V/f etc.
Licensing Software	• Perpetual license of the software should be provided

Warranty	• One year of comprehensive warranty for system along with its interface cards and accessories • Warranty should cover/include parts, labor and transportation cost.
Training	3 days onsite training of the equipment. The training should cover the following applications: 1. Pre-certification of smart inverter controllers. 2. Grid connected converter applications. 3. Renewable energy applications. 4. Microgrid applications. 5. Parallel converter topologies. 6. EV based applications.