

Use this document to detail specifications/requirements for an item and/or ancillary services. 

TITLE: NMR Console Upgrade

Requesting Lab/Division/Group: Physical Measurement Laboratory, 686.08

General Statement of Need

Nuclear magnetic resonance spectroscopy and imaging require precise control of the radiofrequency (RF) pulses as well as their gradient waveforms to accurately measure biomarkers such as T1, T2, and diffusion of materials. As the needs for the medical community continue to develop, there are needs beyond the initially designed nuclear magnetic resonance (NMR) console NIST previously acquired from Tecmag, Inc. (Redstone 37846). The prior system was designed as a single transmit and receive system which at the time served the needs of the project. However recent trends in the community, as well as developments at NIST, require an NMR console that is capable of experiments that range from 0.065 T to 9.4T in magnetic field strength, multinuclear decoupling and detection, and augmentation of gradient waveforms to better serve the needs of our customers.

To this end, the Magnetic Imaging Group (MIG) requires an upgrade to the existing console, which is possible given the open architecture of the Tecmag Redstone. This project would add a second independent transmit and receive channel that allows for heteronuclear decoupling as well as multinuclear detection. This project would also add radiofrequency (RF) amplifiers that would expand the possible range for frequency experiments from 0.5 MHz to 400 MHz which covers the necessary magnetic fields of protons and most other isotopes of 0.065 T to 9.4 T. This project would add a digital-to-analog converter box to the system to allow for the monitoring and altering of gradient waveforms before amplification improving our reliability and uncertainty in measurements. These upgrades would better allow the MIG to meet the needs of the community it currently supports and will provide flexibility for future work.

Items and/or Ancillary Services

Item 1: NMR Console Upgrade for Tecmag Redstone (SN# 37846)

Quantity: 1

Specifications:

- 1.1: Additional transmitter to Redstone 37846. Must operate over the frequency range of 0.5 to 400 MHz at least.
- 1.2: Additional receiver to Redstone 37846. Must operate over the frequency range of 0.5 to 400 MHz at least.
- 1.3: Additional acquisition cluster to Redstone 37846. Must operate over the frequency range of 0.5 to 400 MHz.
- 1.4: All upgrades must fit within the existing NMR console structure.
- 1.5: Renewed 12-month warranty on Redstone upgraded system.
- 1.6: Radiofrequency amplifiers with 250 W of output power covering the frequency range of 0.5 – 400 MHz. Coverage can be achieved by multiple amplifiers.
- 1.7: Gradient waveform digital-to-analog breakout chassis with breakouts for gradient directions

of X, Y, Z and B0 compensation. Must have at least 20 bits of resolution in the waveform.

Separately Priced Options and Services:

Item 2: [List minimum specifications.

Quantity:

Specifications: [Enter quantity here.]

Specification 2.2.: Magnet vibration isolation legs can be operated by dry air or nitrogen

Click or tap here to enter text.

Service Requirements / Item Specifications

Section ⓘ	Requirements/Specifications ⓘ
Planning Considerations <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> List any visits required to allow potential vendors to see site specific constraints. [Explain requirement here] <input type="checkbox"/> US citizen required on-site (foreign nationals require preregistration 30 days prior) <input type="checkbox"/> Vendor rep on-site more than three days <input type="checkbox"/> Other considerations: [List other considerations to ensure an accurate quote]
Shipping & Delivery <input type="checkbox"/> N/A	[Enter shipping and delivery information by item here.] Shipping criteria: <input checked="" type="checkbox"/> Partial delivery acceptable <input type="checkbox"/> Direct delivery to building required [Explain need for requirement here] Building has: <input type="checkbox"/> Loading dock <input type="checkbox"/> Containerization preference: [Choose container] Other requirements: [List any other requirements here] Delivery date criteria: <input checked="" type="checkbox"/> Delivery of goods, installation, and training shall be completed no later than: 5 Months ARO <input type="checkbox"/> Deliver no earlier than: [Insert date here] <input type="checkbox"/> Other: [List other shipping, delivery, or specil requirements]
Electronic Media <input type="checkbox"/> N/A	[Enter electronic media requirements by item here.] <input type="checkbox"/> Software <input checked="" type="checkbox"/> Electronic manuals <input type="checkbox"/> License Key <input type="checkbox"/> Other: [List any other Electronic Media requirements here] All software and manuals to be delievered to Karl Stupic (karl.stupic@nist.gov) and Stephen Russek (Stephen.russek@nist.gov)
Installation <input checked="" type="checkbox"/> N/A	[Enter installation requirements by item here.] <input type="checkbox"/> Vendor technician on site <input type="checkbox"/> Rigging <input type="checkbox"/> Uncrating / Unpackaging <input type="checkbox"/> Removal of packaging material

Requirements / Specification Document

	<input type="checkbox"/> Equipment set up <input type="checkbox"/> Start-up services <input type="checkbox"/> Turn key installation <input type="checkbox"/> Other [Enter details here.] Note: When installation is required, TPOC or COR shall be the coordination point.
Facility / Utility Considerations <input checked="" type="checkbox"/> N/A	[List site specific utility considerations by item here.] <input type="checkbox"/> OFPM Work Order Number(s) [List any Work Order Number(s) here] <input type="checkbox"/> Power available Voltage: [Enter voltage here] (V) Max Current: [Enter max current draw here] (A) Phase: [Choose phase] Frequency: [Typically 60Hz] (Hz) NEMA Plug Type: [Enter plug type here] (i.e.: NEMA L5-20P) Environment: [Choose environment] Other power consideration: [List any other power considerations here] <input type="checkbox"/> Utility connections: [List relevant available utilities, pressure(s), and flowrate(s)] <input type="checkbox"/> Other considerations: [List other considerations to ensure an accurate quote]
Warranty ⓘ <input type="checkbox"/> N/A	Extended Warranty Required [If you require an Extended Manufacturer Warranty, describe the warranty requirements per item here.] What is included? <input type="checkbox"/> Labor <input type="checkbox"/> Parts <input type="checkbox"/> Travel <input type="checkbox"/> Cost and liability for returns <input type="checkbox"/> Other: [Enter other requirements here] <input checked="" type="checkbox"/> Warranty length: Renewal of 12-months Period Length:[Ex. month, 6 month, year etc.]
Training <input checked="" type="checkbox"/> N/A	[Training requirements (who, when, what, where) here. If on-site, is travel necessary?] <input type="checkbox"/> On-site <input type="checkbox"/> Off-site location: [Enter location(s) here] <input type="checkbox"/> Number of trainees: [Enter number of trainees here] Scope of training: <input type="checkbox"/> Operations <input type="checkbox"/> Maintenance <input type="checkbox"/> Troubleshooting <input type="checkbox"/> Safety <input type="checkbox"/> Other: [Enter other scope requirements here] <input type="checkbox"/> Training materials to be provided: [Describe requirement here] <input type="checkbox"/> Other: [Enter other training requirements here] Note: When training is required, TPOC or COR shall be the coordination point.

**Inspection and
Acceptance**☐ N/A

[Enter inspection requirements per item here]

☒ Planned government acceptance testing (7 business days)☐ Gov't acceptance expected to take longer than 7 business days: [Duration]☒ Inspection and acceptance plan: NMR Console will be tested via standard measurements previously carried out to ensure proper operation of the system and that data is comparable to previous data.☐ Other: [Enter other requirements here]**Maintenance** ⓘ☒ N/A

[Describe your maintenance requirements per item here]

Period Length: [Ex. month, 6 month, year etc.]

What is included?

☐ Labor☐ Spare parts☐ Consumables☐ Travel☐ Cost and liability for returns☐ Software updates☐ Manuals☐ Service plan length: [Enter service plan length here]☐ Other: [Enter other requirements here]☐ Requirements: [Enter requirements here] (i.e.: onsite within 72 hours, etc.)☐ Option Period 1☐ Option Period 2☐ Option Period 3☐ Option Period 4**Government
Furnished
Material /
Equipment**☐ N/A

Tecmag Restone NMR Console

☐ Samples for testing☒ Government equipment which will leave gov't site (TPOC must coordinate with division property custodian)

Serial Number: 37846

Description: NMR Console

NIST property number: [Enter NIST property number here]

☐ Other: [Enter other details here]**Travel**☒ N/A

[Describe any travel requirements per item here]

☐ Explain: [Explain here]☐ Other: [Enter other requirements here]

Vendor: To the maximum extent possible, include as part of appropriate sections above (maintenance, repair, etc.). Otherwise, it will be a separate line item, reimbursable per the Federal Travel Regulation.

Provide suggestions to improve this form by clicking [here](#).