Q&A Addendum

Bid # IFB04082026
Manufacturing Execution System (MES)

This document provides question and answer information pertaining to the above captioned RFP and will be updated as necessary.

REMINDER: It is the Respondent's responsibility to thoroughly read and examine the entire Bid document and any addenda to the Bid.

1. Software Functionality

• Could you provide detailed requirements (or a requirements worksheet) covering the following areas:
  - Traceability: Serialized tracking, late-stage serialization, lot ID management, containerization, work order splits/merges, and material consumption
    - Does material itself require serialization, and at what level (e.g., wafer, die, sub-component)? Yes – wafer/die/sub.
    - Are genealogy and backward/forward traceability required across multi-step processes? Yes.
  - Data Collection: Expectations for SPC, equipment data collection, material tracking, WIP tracking, and parameter-level data acquisition
    - Are there requirements for real-time equipment data collection (e.g., via SECS/GEM or similar protocols)? Yes.
  - System Integration: Required integrations with third-party software, tools, and equipment
    - Are there existing MES-adjacent systems (ERP, PLM, LIMS, EAP) that must be tightly integrated? Likely, expecting "canary" for a real-time data clouding add-on to push data to MES, etc.
  - Equipment Management: Asset states, maintenance tracking, calibrations, and utilization monitoring
    - Are Equipment Utilization metrics or uptime/downtime classifications required? Yes.

• What are your expectations regarding AI, advanced analytics, or predictive capabilities (e.g., predictive maintenance, yield optimization, anomaly detection)? Interested - provide as option(s) in the quotation.

• What quality metrics are required for both product and material tracking (e.g., yield, defect density, parametric limits)? Yes...all.

• Is there a predefined list of scrap codes? If so, how are they applied (e.g., during WIP, receiving inspection, inline processing)? Yes...tbd.

• Are there any known or expected customizations, or is the preference to leverage configurable, out-of-the-

box MES capabilities where possible? Leverage configurable where able but expect some customization.

• Will the MES be responsible for label generation/printing, or should it integrate with an external labeling platform?

o If applicable, what objects require labeling (e.g., equipment, work orders, wafers, carriers, materials, finished goods)? Yes, all...likely external platform?

• What manufacturing modes must be supported:

o Batch processing

o Single-piece flow

o A hybrid of both? Hybrid of both.

• Semiconductor-Specific Requirements: Could you provide detail on any of the following requirements:

o Wafer-level tracking and wafer mapping (die-level traceability, binning, map import/export formats) Yes - all of the above.

o SECS/GEM or other equipment communication protocols for tool integration Yes...tbd...likely requires, a deeper discussion?

o SEMI standards compliance, such as:

- Equipment states and metrics (SEMI E10) Yes.
- Interface standards (SEMI E30, E40, E87, E90, etc.) Yes, tbd.

o Recipe management and validation, including version control and enforcement at the tool level Yes.

o Carrier/container tracking (FOUPs, SMIF pods, reticles) Yes.

o Rework and hold management, including disposition workflows Yes.

o Process route enforcement Yes.

o Engineering vs. production lot handling Yes.

o Parametric data collection tied to process steps and equipment runs Yes.

o Defect tracking and classification, including integration with inspection/metrology tools Yes.

o Cleanroom and environmental tracking (if applicable) Yes.

o Compliance requirements related to ITAR, EAR, or other regulated environments Yes, ITAR and CUI

cmmc level 2.

2. Customer & Educational Portals

• Is the expectation for the vendor to build:

o A fully custom solution, or

o An interface layer integrating with existing MUSiC-developed solutions? This is likely ideal.

• What user groups will access these portals? Students, faculty, staff.

• Will data segregation be required (e.g., ITAR-restricted users)? Yes.

• Can you provide more granular functional requirements for these portals?

3. Budget

• What is the overall budget range for this project? Adequate but provide best cost proposal due to heavy cost consideration for competitive bid.

• Is there a separate budget allocation for the Customer and Educational Portals, or are these expected to be configured within the MES (e.g., dashboards, reports, access controls)? No...configured within if can be properly segregated/silo'd.

4. User Scope

• What is the anticipated number of:
o Named users at initial deployment, and 5 – 10.

o Is growth expected over time? 20 – 100.

• Will system access be limited to internal users (e.g., university staff and researchers), or will external collaborators (federal agencies, industry partners) require access? Will want full access to internal users (per controlled access protocol) and limited dashboard access for external customers.

• For the Customer Portal and Education Portal, can you estimate:
o External user counts 25 – 100.

o Student user counts 25 – 100.

• Will role-based access controls be required (e.g., operators, engineers, administrators, read-only)? Likely.
o If so, can you describe the expected role distribution?

5. Equipment & Facility Scope

• How many equipment systems (e.g., process tools, metrology equipment) are in scope? 25 – 50.

• Of those, how many require direct MES integration (API or equipment-level connection)? 12 – 25.

• How many fabrication facilities (fabs) will use the system? 2 (Ph1 and Ph2 space) - 3 (+HiDEC).

• Will these facilities require logical or data segregation? Yes.

6. Support Requirements

• What are your expectations for support coverage:
o Business hours only 99%.

o 24/7 support? 1%.

• Is on-site support required at any stage, or is remote support sufficient? Unclear at this point...likely

onsite during initial implement.

• What are the expected SLA response times for critical issues impacting production? Real-time (where able), what are options here?

• Is a dedicated support contact/account manager required, or is a shared support model acceptable? Dedicated during implement preferred - shared thereafter okay.

7. Installation & Deployment Scope

• What are the initial and long-term use cases for the MES? Consider the functions of a typical low-volume foundry that is also used for r&d and education. So, we want to track and monitor everything that we can.
    o Are these formally documented? WIP.

• What is the preferred deployment model:
    o On-premises

    o Cloud

    o Hybrid Hybrid. (Especially considering ITAR/EAR and CMMC Level 3 requirements) Yes.

• What existing infrastructure is available (servers, network, endpoints), and what is expected from the vendor? UA IT is ready to receive recommended specs for MES server, etc. We are working thru the exact on-site infrastructure and prefer hybrid/redundancy in terms of data storage and backup.

• Is a phased rollout anticipated, or a single full deployment? Likely 75% in a full deployment and then the last 25% as a phased rollout, especially with education layer and tool/safety systems integration.

• Are there any legacy systems requiring integration or data migration? TBD...we do have some older tools that may or may not integrate easily, but all possibilities should be considered.

• Are reports, dashboards, and outputs already defined, or should these be developed collaboratively?
    o Does this include items like Certificates of Completion (CoC)? Some are conceived, not set in stone, and we anticipate this being part of the final, phased roll-out to make sure we've covered all the bases.

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