Technical Instruction 012
Reference Statement of Work: Paragraph 2.3q

Tasks:

Task 1: Gemini Scalable Coupling Support

- Current coupled DYSMAS simulations can see parallel inefficiencies that are not due to the current master-master communication between the codes. Performance analyses have indicated that the geometry package of Gemini can be a bottleneck. In addition, imbalances in workload between the Gemini processes can occur when coupling is introduced since the current partitioning scheme does not consider coupling.

- Provide an enhanced Gemini geometry package with improved scalar efficiency and modernized code.

- Provide enhanced Gemini mesh partitioning by considering not only the fluid mesh but the structural interface mesh as well. Evaluate the need to dynamically load balance coupling work (due to body movement, increased mixed cells, or other responses that increase the workload for some of the processes and thus unbalance the simulation).

Task 2: Updated Gemini Theory Manual

Update the Gemini Theory Manual to reflect the current version of the code.

Task 3: Gemini Support

Provide technical support to IHD/NSWC for the verification, validation, debugging, exercise, and improvement of Gemini.

Deliverables:

No.	Tasks & Deliverables
1	DYSMAS Coupling Support
	1) Updated Gemini code
2	Updated Gemini Theory Manual
	1) New Theory Manual document
3	DYSMAS Support

Conditions:

This TI is not intended to (1) assign work not covered by the scope of the task order; (2) direct a change as defined in the clause entitled “Changes”; (3) increase or decrease the estimated contract cost, the fixed or award fee, the fixed price, the level of effort, or the time required for contract performance; or (4) change any of the terms, conditions, or specifications of the Master Contract and/or Task Order. In the event you consider these requirements to represent a change for which you are entitled to an equitable adjustment, you are to comply with the requirements of the “Changes” clause of the contract and resolution from the Government Contracting Officer must be obtained prior to proceeding with this effort.

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