



NASA SBIR 2011 Phase I Solicitation

02.01 Nano/Small Sat Launch Vehicle Technology

Lead Center: KSC

Participating Center(s): ARC

The space transportation industry is in need of low-cost, reliable, on-demand, routine space access. Both government and private entities are pursuing various small launch systems and architectures aimed at addressing this market need. Significant technical risk and cost exists in new system development and operations - reducing incentive for private capital investment in this still-nascent industry. Public and private sector goals are aligned in reducing these risks and enabling the development of small launch systems capable of reliably delivering payloads to low Earth orbit. The Nano/Micro Launch Vehicle (NMLV) will provide the nation with a new, small payload access to space capability. The primary objective is to develop a capability to place nano and micro satellites weighing up to approximately 20 kilograms into a reference orbit defined as circular, 450 kilometer altitude, from various inclinations ranging from 0 to 98 degrees.

This SBIR subtopic seeks commercial solution in the areas of nano and micro spacecraft launch vehicle technologies.

This subtopic will particularly focus on higher risk entrepreneurial projects for dedicated nano and micro spacecraft launch vehicles. This subtopic seeks proposals including, but not limited to, the following areas:

- Sub-orbital booster conceptual designs of system/architectures capable of reducing the mission costs associated with the launching of small payloads to LEO.
- Sub-orbital booster technologies traceable to an orbital capable Nano/Micro Launch Vehicle (NMLV)*, whereby specific technologies are identified for Phase II development and test.

For all above technologies, research should be conducted to demonstrate technical feasibility during Phase I and show a path towards Phase II hardware/software demonstration with delivery of a demonstration unit or software package for NASA testing at the completion of the Phase II contract.

Phase I Deliverables: Feasibility study, including simulations and measurements, proving the proposed approach to develop a given product.

Also required are for all technologies are performance predictions, cost objectives, and development and demonstration plans for the Nano/Micro Launch Vehicle (NMLV). Formulate and deliver a verification matrix of measurements to be performed in Phase II, along with specific quantitative pass-fail ranges for each quantity listed.

The report shall also provide options for commercialization opportunities after Phase II.

Phase II Deliverables: Working engineering model of proposed Phase I components or technologies, along with full report on development and measurements, including populated verification matrix from Phase I. The prototype hardware shall emphasize launch cost reduction technologies, and possess sufficient design information to fabricate, integrate, and operate the selected high-risk component(s) for demonstration. Refinement of the sub-orbital booster design is required as knowledge is gained through the critical component development process. Exit TRL 5-6 is expected at the end of Phase II

*The NMLV would be a smaller vehicle than the Pegasus launch vehicle which is considered a Small Launch Vehicle (SLV).