

Request for Proposal RFP_2019_0129: Overspeed Protection for Turbochargers

RFP Title	Overspeed Protection for Turbochargers
Due Date	27/09/2019
Opportunity	Technology licensing or acquisition, joint development
Timeline	Dependent upon the current maturity of the proposed solution
Financials	To be negotiated
RFP Description	NineSigma, representing a major manufacturer of industrial equipment , invites proposals for a fast-acting mechanism that will provide an overspeed protection system for turbochargers.
Background	<p>NineSigma's client manufactures turbochargers, which are used to boost the performance of various types of engines. Each turbocharger contains a turbine, rotating at very high speed (up to 100,000 rpm), driven by the exhaust gas from the engine to which it has been fitted.</p> <p>Under certain failure conditions, it is possible for the speed of the turbine in the turbocharger to become unregulated. In such cases, it is possible for the turbine to quickly accelerate out of its safe operating zone to the point where the overspeeding causes the turbine to fail. Although protective housings are currently used to ensure that any such turbocharger failure does not cause any injury or damage to other equipment, our client would like to find a mechanism to prevent the turbocharger from overspeeding in the first place.</p> <p>Although our client has already considered various approaches for overspeed protection, no solution has so far been identified which meets their three essential criteria:</p> <ol style="list-style-type: none">1. Very fast acting, so that the protective mechanism is only triggered after the turbine speed exceeds the normal operating range, but acts quickly enough to prevent the turbine reaching the critical speed2. Extremely reliable, so that the safety function is dependable and will operate without fail should the turbine speed ever exceed the safety threshold3. Commercially viable (cost effective to be incorporated into production equipment)
Key Success Criteria	<p>The successful technology will:</p> <ul style="list-style-type: none">• Meet the following criteria:• Trigger: Only operate when a turbine exceeds 105% of its rated speed• Respond within 450 milliseconds after the turbine exceeds 105% of its rated speed• Act to limit the speed of the turbine, so that it doesn't exceed 125% of its rated speed• Be suitable for incorporation into the design of the turbocharger and for serial production• Be durable and suitable for use in equipment attached to engines working at elevated temperatures• Show potential in its design for meeting a Safety Integrity Level (SIL)• If there is already data available regarding the ability to meet a SIL, this would be a very strong advantage

Other assessment criteria:

- A simple solution would be preferable to a more complex solution (more likely to satisfy cost and reliability criteria)
- A solution which is potentially retrofittable to existing equipment would be of particular interest

NineSigma's client is willing to consider early stage concepts and is willing to work with the solution provider to further develop their system.

Area of Interest

Engineering-Mechanical
 Engineering-Industrial > Industrial Testing and Analysis
 Engineering-Industrial > Safety Engineering
 Engineering-Electrical > Electrical and Electronics
 Engineering-Electrical > Sensors
 Engineering-Electrical > Sensors Engineering
 Engineering-Mechanical > Mechanical Design
 Engineering-Mechanical > Mechanical Testing and Analysis
 Engineering-Mechanical > Mechanical Engineering-General

Possible Approaches

Possible approaches might include, but are not limited to:

- Mechanical braking mechanisms
- Mechanisms which act on the bearings or rotating shaft or create imbalances
- Sub-components which fracture or otherwise disconnect the turbine from the shaft on overspeed
- Centrifugal devices or speed governors
- Valves and actuators

In the event that the overspeed protection mechanism is ever activated, the turbocharger will immediately be taken out of service, so that the equipment can be checked and the cause of the problem investigated. Therefore, **it is not necessary for the protection system to immediately "re-set" itself**; it would be acceptable if components are damaged and need to be repaired/replaced before the turbocharger can be brought back into service, for example.

Approaches not of Interest

Preferred Collaboration Types

Joint Development
 Technology Acquisition
 Technology Licensing

Items to be Submitted

Your response should address the following:

- **Non-confidential description** of proposed technology:
- Operating principle which is being used for overspeed protection
- Technical maturity (concept, prototype, ready to commercialize, commercialized)
- Description of the application for which the solution was originally developed
- Further development work that is likely to be required for the client's turbocharger application
- **Indications / Evidence showing that the proposed solution is likely to meet the required Key Success Criteria**
- Include a non-confidential summary with performance test data if possible
- Information about any demonstration/test facilities that could be made available
- Team/organization description and relevant experience
- Position on intellectual property including patent references
- Any information about possible cost of the solution would be very useful, but is not essential

Award Amount

Attachments

No Files Selected

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Picture

