

Company Name: **Cottrill Cyclodyne Corporation**
Proposal #: **SBIR 2001-I A8.02-9234**
Project Title: **Powerplant Which Transitions Automatically to Ramjet Operation**
Principal Investigator: **Larry Cottrill**

=Factor 1: Scientific/Technical Merit and Feasibility=

Reviewer 1 :

The proposal's idea of developing a viably efficient automatically transitioning power plant to ramjet operation will undoubtedly have ample commercial applications and will result in reduced costs compared to present power plant designs. However, this proposal's scientific and technical merits are not stated and explained clearly. Utilizing ejector action to draw air into a power plant is a good idea but is not clearly quantified and analyzed in this proposal. Flow patterns and direction are not backed by scientific and detailed analysis and may not be as PI describes in his narrative proposal. Reasoning and explanation for flow patterns into inner and outer combustion regions, and the inlet recycling region are not very rigorous and lack computational support and validation. It is technically questionable whether such flow patterns and mass flow rates can be achieved and are feasible with current design.

Reviewer 2 :

The concept presented contains inherent technical problems which would limit the device to the point where this system would be impractical for the application proposed. An explanation of the way in which this concept would allegedly operate was presented, however, this was not backed up with the necessary (even preliminary) analysis to verify the performance claims are possible. The use of hydrogen fuel was listed in the task descriptions, but no discussion of candidate fuels and the selection of fuels was provided.

=Factor 2: Experience, Qualifications, and Facilities=

Reviewer 1 :

PI has a very diverse and wealthy background in a number of areas applicable to parts of this effort, he has shown an ability to be a self learner and perform well at what he does. However, PI lacks training in the area of propulsion, specially in fluid dynamics and combustion. To develop an efficient engine requires detailed knowledge in a number of fields that PI does not possess. Facilities available for testing are inadequate and they lack proper instrumentation and safety precautions. Specially, in the area of understanding the flow behavior into the inlet and air recycling inlet and combustion process which are crucial for PI's power plant success.

Reviewer 2 :

The principal investigator has no vocational experience in propulsion system design. He has a fairly broad background in several supporting disciplines which would help him carry out this proposed activity. His formal education is significantly limited (no college degree, some virtually un-related college course work). He currently is the sole employee of this company and, therefore, does not currently have any individuals with strong relevant background, training, or experience immediately available to assist in this proposed activity. No analytical results were presented to provide a technical foundation for the concept, and to demonstrate the technical knowledge of the principal investigator.

=Factor 3: Effectiveness of the Proposed Work Plan=

Reviewer 1 :

PI has a detailed comprehensive work plan. PI seems to have a very good handle on design and fabrication issues and time tables related to that. PI has performed pricing of the essential items required for completion of listed tasks and optimizes use of resources he is requesting.

Reviewer 2 :

The proposed work has a strong experimental element which will directly examine the operation of this device. There was not any significant analytical/ computational effort described which would be necessary to interpret the performance results observed. The scope of the test (due to the relatively simple design of the design) would probably be do-able by the principal investigator and subcontractor. Safety issues surrounding this experimental activity (particularly the use of hydrogen fuel) were not addressed.

=Overall Technical Evaluation=

Reviewer 1 :

Reviewer 2 :

The primary strength is the principal investigator appears to be an innovative individual and is motivated to explore his idea and will work hard in an attempt to make this device operate. A strength is also the relatively simple design and construction of this device. A weakness is the limited background and experience of the principle investigator in this technical area. A weakness is the inherent technical challenges of this device as shown which would make it impractical for the system proposed. No specific analysis was presented which would show the device could be made to operate in the manner described.

=Factor 4: Commercial Merit and Feasibility=

Reviewer 1 :

Reviewer 2 :

With some re-design and development an "engine" with some of the features included in this device may be useful in the scale model market.

=Comments on NASA Facility Requirements= [note: No NASA facilities were requested]

Reviewer 1 :

Reviewer 2 :