



Cover Page for Proposal
Submitted to the
National Aeronautics and
Space Administration

NASA Proposal Number
TBD on Submit

NASA PROCEDURE FOR HANDLING PROPOSALS

This proposal shall be used and disclosed for evaluation purposes only, and a copy of this Government notice shall be applied to any reproduction or abstract thereof. Any authorized restrictive notices that the submitter places on this proposal shall also be strictly complied with. Disclosure of this proposal for any reason outside the Government evaluation purposes shall be made only to the extent authorized by the Government.

SECTION I - Proposal Information

| | | | | | |
|--|--|---|--------------------|---|--|
| Principal Investigator Paul Murad | | E-mail Address mb@morningstarap.com | | Phone Number 805-889-7012 | |
| Street Address (1) 1441 Montague Dr | | | Street Address (2) | | |
| City Vienna | | State / Province VA | | Postal Code 22182-1440 | |
| Country Code US | | | | | |
| Proposal Title : The Morningstar Energy Box | | | | | |
| Proposed Start Date 01 / 06 / 2015 | | Proposed End Date 09 / 06 / 2015 | | Total Budget No budget required | |

SECTION II - Application Information

| | | | | | |
|--|--|--|--|---|--|
| NASA Program Announcement Number NNH15ZOA001N-15NIAC_A1 | | NASA Program Announcement Title NASA Innovative Advanced Concepts (NIAC) Phase I | | | |
| For Consideration By NASA Organization <i>(the soliciting organization, or the organization to which an unsolicited proposal is submitted)</i> NASA , Headquarters , Space Technology Mission Directorate , NIAC | | | | | |
| Date Submitted | | Submission Method Electronic Submission Only | | Grants.gov Application Identifier | |
| Applicant Proposal Identifier Dr. Minkwan Kim | | | | | |
| Type of Application New | | Predecessor Award Number | | Other Federal Agencies to Which Proposal Has Been Submitted | |
| International Participation Yes | | Type of International Participation Collaborator | | | |

SECTION III - Submitting Organization Information

| | | | | | | | |
|--|--|---------------------------|-------------------------------|---|----------------------------------|--------------------------------|----------------------------|
| DUNS Number 964267442 | | CAGE Code 65V29 | | Employer Identification Number (EIN or TIN) 271079503 | | Organization Type 2K | |
| Organization Name (Standard/Legal Name) Morningstar Applied Physics, LLC | | | | | Company Division | | |
| Organization DBA Name | | | | | Division Number | | |
| Street Address (1) 1441 MONTAGUE DR | | | | Street Address (2) | | | |
| City VIENNA | | | State / Province VA | | Postal Code 22182-1440 | | Country Code USA |

SECTION IV - Proposal Point of Contact Information

| | | | | | |
|---------------------------|--|--|--|-------------------------------------|--|
| Name Paul Murad | | Email Address pm@morningstarap.com | | Phone Number 703-759-2028 | |
|---------------------------|--|--|--|-------------------------------------|--|

SECTION V - Certification and Authorization

Certification of Compliance with Applicable Executive Orders and U.S. Code

By submitting the proposal identified in the Cover Sheet/Proposal Summary in response to this Research Announcement, the Authorizing Official of the proposing organization (or the individual proposer if there is no proposing organization) as identified below:

- certifies that the statements made in this proposal are true and complete to the best of his/her knowledge;
- agrees to accept the obligations to comply with NASA award terms and conditions if an award is made as a result of this proposal; and
- confirms compliance with all provisions, rules, and stipulations set forth in this solicitation.

Willful provision of false information in this proposal and/or its supporting documents, or in reports required under an ensuing award, is a criminal offense (U.S. Code, Title 18, Section 1001).

| | | | | | |
|---|--|--------------------|--|--------------|--|
| Authorized Organizational Representative (AOR) Name | | AOR E-mail Address | | Phone Number | |
| AOR Signature <i>(Must have AOR's original signature. Do not sign "for" AOR.)</i> | | | | Date | |

| | | | |
|---|---------------------------------------|--|---|
| PI Name : Paul Murad | | NASA Proposal Number TBD on Submit | |
| Organization Name : Morningstar Applied Physics, LLC | | | |
| Proposal Title : The Morningstar Energy Box | | | |
| SECTION VI - Team Members | | | |
| Team Member Role PI | Team Member Name Paul Murad | Contact Phone 805-889-7012 | E-mail Address mb@morningstarap.com |
| Organization/Business Relationship Morningstar Applied Physics, LLC | | Cage Code 65V29 | DUNS# 964267442 |
| International Participation No | U.S. Government Agency | | Total Funds Requested 0.00 |

| | |
|---|--|
| PI Name : Paul Murad | NASA Proposal Number TBD on Submit |
| Organization Name : Morningstar Applied Physics, LLC | |

Proposal Title : **The Morningstar Energy Box**

SECTION VII - Project Summary

Morningstar Applied Physics, LLC Proposes investigating a different scheme for generating a potential embryonic electromagnetic propulsion technology. This is in response to:

NASA INNOVATIVE ADVANCED CONCEPTS (NIAC), PHASE I - APPENDIX NUMBER: NNH15ZOA0001N-15NIAC-A1.

The Morningstar Energy Box is a revolutionary derivative based upon both a Searl and the Russian device by Godin and Roschin. The game-changing technology Energy Box is similar to a mechanical cage per the Russians, uses laminated rollers per Searl and a unique main ring with a ferromagnetic fluid reservoir to enhance electrical and magnetic properties. During early experimental test, this electromagnetic device lost 2 to 5 pounds of its 190 pounds at steady-state rotation. Thru transient motion, the weight change dropped as much as 20 to 40 pounds. During a final test series, the device unexpectedly showed a 14-pound weight reduction or 7.3% loss during steady-state; loss of 12% occurred during transient situations.

Several possible explanations were identified where some of these explanations may fall within supportable technical evidence or speculation. These efforts include: conversion of angular momentum to linear momentum, a Poynting field effect, retarded E-M potentials, Cogravitation, Matter waves, gravitational wave effects and a conjecture thru the 'N' Dimension axis. With this additional spectrum of feasibilities, a serious need warrants further determination about what induces the weight changes which may impact synthesizing a future space propulsion concept.

The proposed activity will perform experiments to reproduce this data. Once achieved our objective is to perform three more experiments using an altered version of the device that we feel would more greatly impact the magnetic vorticity that may reduce more weight. Once this experimental data is performed, we would like to identify or validate a rationale why the device lost weight. The activity is for 9 month effort at \$90 K. If successful, the device may be altered for a space propulsion system.

| | |
|---|---|
| PI Name : Paul Murad | NASA Proposal Number TBD on Submit |
| Organization Name : Morningstar Applied Physics, LLC | |

Proposal Title : **The Morningstar Energy Box**

SECTION VIII - Other Project Information

Proprietary Information

Is proprietary/privileged information included in this application?

Yes

International Collaboration

Does this project involve activities outside the U.S. or partnership with International Collaborators?

Yes

| | | | | |
|-------------------------------------|------------------------------|----------------------------|------------------------|-------------------------|
| Principal Investigator No | Co-Investigator No | Collaborator Yes | Equipment No | Facilities No |
|-------------------------------------|------------------------------|----------------------------|------------------------|-------------------------|

Explanation :

Dr. Kim has over 8 years of research experience in the field of hypersonic aerothermodynamics and magneto hydrodynamics (MHD). He received the Ph.D. degree in Aerospace Engineering in August 2009 from the University of Michigan with specialization in Magneto Hydrodynamics (MHD) and hypersonic aerothermodynamics under the advising of Professor Iain D. Boyd. During the last five years, Dr. Kim carried out innovative and leading-edge research in the field of plasma physics and aerospace engineering such as plasma communication, magnetic heat shield, and, MHD parachutes. He has published over 20 scientific articles in peer-reviewed conference proceedings and internal journals. As a postdoctoral research fellow at the University of Michigan, he developed a physical model to describe electron energy phenomena. The developed electron temperature model has been successfully implemented in a hypersonic CFD code to simulate the electron temperature of Stardust entry capsule, which had previously never been done by CFD. In the German Aerospace Centre (DLR), he developed the end-to-end model of a plasma wind tunnel. He is already recognized as a research leader in the field of planetary re-entry and MHD and well known for my plasma communication scheme in the MHD research community. Since he experienced experimental research in DLR, he is one of few scientists who have both numerical and experimental knowledge in the field of MHD. Currently, he is a lecturer in the University of Adelaide, Australia, which is equivalent to Assistant Professor in US university system. He is also a member of the Plasmadynamics and Laser (PDL) Technical Committee (TC) in the AIAA.

NASA Civil Servant Project Personnel

Are NASA civil servant personnel participating as team members on this project (include funded and unfunded)?

No

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|
| Fiscal Year | Fiscal Year | Fiscal Year | Fiscal Year | Fiscal Year | Fiscal Year |
| Number of FTEs | Number of FTEs | Number of FTEs | Number of FTEs | Number of FTEs | Number of FTEs |

| | |
|---|---|
| PI Name : Paul Murad | NASA Proposal Number TBD on Submit |
| Organization Name : Morningstar Applied Physics, LLC | |
| Proposal Title : The Morningstar Energy Box | |

SECTION VIII - Other Project Information

Environmental Impact

| | |
|---|--|
| Does this project have an actual or potential impact on the environment? No | Has an exemption been authorized or an environmental assessment (EA) or an environmental impact statement (EIS) been performed? No |
|---|--|

Environmental Impact Explanation:

Exemption/EA/EIS Explanation:

| | |
|---|--|
| PI Name : Paul Murad | NASA Proposal Number TBD on Submit |
| Organization Name : Morningstar Applied Physics, LLC | |
| Proposal Title : The Morningstar Energy Box | |

SECTION VIII - Other Project Information

Historical Site/Object Impact

Does this project have the potential to affect historic, archeological, or traditional cultural sites (such as Native American burial or ceremonial grounds) or historic objects (such as an historic aircraft or spacecraft)?

No

Explanation:

| | |
|---|--|
| PI Name : Paul Murad | NASA Proposal Number TBD on Submit |
| Organization Name : Morningstar Applied Physics, LLC | |
| Proposal Title : The Morningstar Energy Box | |

SECTION IX - Program Specific Data

Question 1 : Identify whether you have proposed substantially the same kind of research or technology development under any other STMD solicitation within the last 9 months. Provide STMD Solicitation Number and Application or Proposal Identifier.

Answer: No.

Question 2 : Select the Principal Investigator's Organization Type

Answer: Industry

Question 3 : If the answer to Question #2 is "Other, please describe.

Answer:

N/A

Question 4 : If the answer to Question #3 is "NASA", to which Center is the Principal Investigator assigned?

Answer:

Question 5 : NIAC is required to report on NASA involvement in NIAC proposals and studies. Excluding the PI, are any NASA Civil Servants or NASA Centers involved in the proposed study?

Answer: Not including the PI, no NASA Civil Servants and no NASA Center

Question 6 : Approximate Technology Readiness Level (TRL) of your proposed concept at the start of the effort?

Answer: 2

Question 7 : Select the Technology Area Breakdown Structure (TABS) most closely associated with your submission/proposed concept.

Answer: 10.3 Propulsion

Question 8 : If your concept is best associated with two TABS areas (i.e., both are major aspects, so association with only one could be inadequate), you may identify a second area.

Answer: 2.0 In-Space Propulsion Technologies

Question 9 : To help NASA obtain demographic diversity information, what is the PI's gender?

Answer: Male

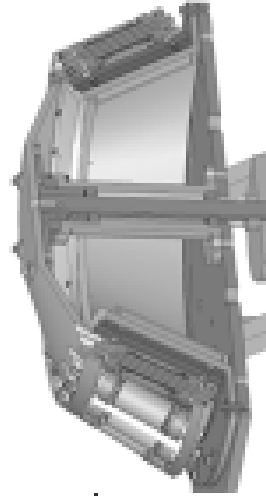
| | |
|---|--|
| PI Name : Paul Murad | NASA Proposal Number TBD on Submit |
| Organization Name : Morningstar Applied Physics, LLC | |
| Proposal Title : The Morningstar Energy Box | |
| SECTION X - Budget | |
| Total Budget: No budget required | |



Morningstar Energy Box *Paul Murad, Morningstar Applied Physics, LLC.*

Concept

- This is a rotating electromagnetic device with unusual characteristics.
- We would want to retest this and a modified configuration.
- This device has space propulsion implications.



Study Approach

- An earlier configuration was tested and generated a weight loss of 7% at a TRL of 3.
- We would want to retest this configuration to see if results are reproducible.
- Once performed, we would test the altered configuration as seen here at a TRL of 1.

Benefit

- A candidate concept for testing...

Evaluation Notes

- This activity focuses upon tests to reduce weight of this device compared with the earlier configuration.
- We want to find an understanding for why the weight was lost.

2. Technical & Management Section

The Morningstar Energy Box

Morningstar Applied Physics, LLC Proposes investigating a different scheme for generating a potential embryonic electromagnetic propulsion technology. This is in response to: **NASA INNOVATIVE ADVANCED CONCEPTS (NIAC), PHASE I - APPENDIX NUMBER: NNH15ZOA0001N-15NIAC-A1.**

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Morningstar has examined several unusual activities involving natural rotational effects from tornadoes, levitation or other phenomena. This also involves the Morningstar Energy Box [1, 2], which is a device that takes advantage of a rotating electromagnetic field. Interestingly, the 190 pound electromagnetic Morningstar device showed nonlinear behavior where during several tests, it demonstrated a loss of 7% of the device's weight during steady-state operation [2]. These unusual events required examining a different scientific logic toward understanding electric and magnetic fields as well as gravitation. Although perplexed by this response, we sought different rationales that might explain the weight reduction. A serious rationale resulted in a derivation of the Poynting Field Conservation Law, which was recently derived in the Murad-Brandenburg (M-B) equation [3-5]. We are proposing to further examine this understanding of these scientific principles for creating an application and extend to other space propulsion.

The name "*Energy Box*" is a misnomer. The original purpose of the device was to originally create a magnetic motion drive. Unfortunately this did not occur when experiments revealed that the device could alter its weight. This was unexpected. The unusual operation of this device is that the rollers move within a three-dimensional magnetic field in a circular kinematic trajectory that differs from an axisymmetric electrical motor because of the electromagnetic field trajectory.

This revolutionary variant is based upon at least three possible theoretical principles. These possibilities are:

- *Angular momentum*- The idea is to change Mother Nature by transferring angular momentum into linear momentum in the gravity tensor of Einstein’s field equations possibly similar to the Russian motives.
- *Gravito-Electro-Magnetism (GEM)*- This notion uses a Poynting vector force induction based upon the roller design that acts like magnetic dipoles, and
- *Retarded Potentials*- The ring acts as a roller reflection plane on the ring. If the time is retarded or through magnetic hysteresis, it is possible that the image and subsequent forces from one roller may attract the adjacent roller to create self-acceleration.

Early Analysis

The first approach would allow angular motion to induce linear motion using interactions with magnetic and electric fields. The second approach initially looks at a magnetic roller/capacitor around the ring. When roller motion is started, an electric field is created by Maxwell-Heaviside’s equations. If the magnet is longitudinal and the electric field in the roller is radially oriented, the Poynting vector, which is the cross product between the electric and magnetic fields, would create a force to induce motion. John Searl’s use of dielectrics tends to act like a capacitor, thus it is obvious that the Searl roller creates such a Poynting vector effect.

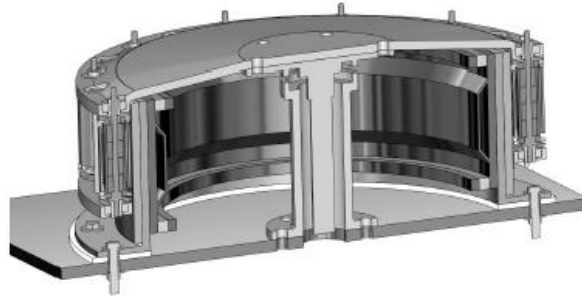
Additionally, we have found a derivation for the Poynting field conservation that offers additional effects dependent upon separate magnetic and electric fields. The Poynting field looks very promising but requires further investigations. Preliminary evaluations suggested that the driving force would be the Poynting force. On this basis, we derived a Poynting Field Conservation Law or M-B equation:

$$\mu_0 \left[\frac{1}{c^2} \frac{\partial^2 \bar{S}}{\partial t^2} - \nabla^2 \bar{S} \right] = \mu_0 \nabla \times \nabla \times \bar{S} - 2 \nabla \times \bar{B} \times \nabla \times \bar{E} - 4\pi \left[-\frac{1}{c} \frac{\partial}{\partial t} (\rho_e \bar{E} + \rho_m \bar{B}) + \frac{1}{c} \frac{\partial}{\partial t} (\bar{J}_e \times \bar{B} + \bar{E} \times \bar{J}_m) \right. \\ \left. - \nabla (\bar{J}_e \cdot \bar{E} + \bar{J}_m \cdot \bar{B}) \right].$$

Letters refer to vector quantities; \bar{E} and \bar{B} are the electric and magnetic fields respectively, e is the electrical charge, \bar{S} is the Poynting vector, \bar{J} values are currents and ρ values are source terms. Subscripts m and e imply magnetic and electric fields respectively. The term μ is an electro-physical constant. Although it is not normally accepted about magnetic sources or currents, the view is that the Van Allen belts are predominantly due to a magnetic field and not the Earth’s electric field. There is considerable motion in the Van Allen belt caused strictly by the forces of the magnetic field, hence we are using an assumption that the magnetic current allows motion along the lines of force analogous to a bar magnet.

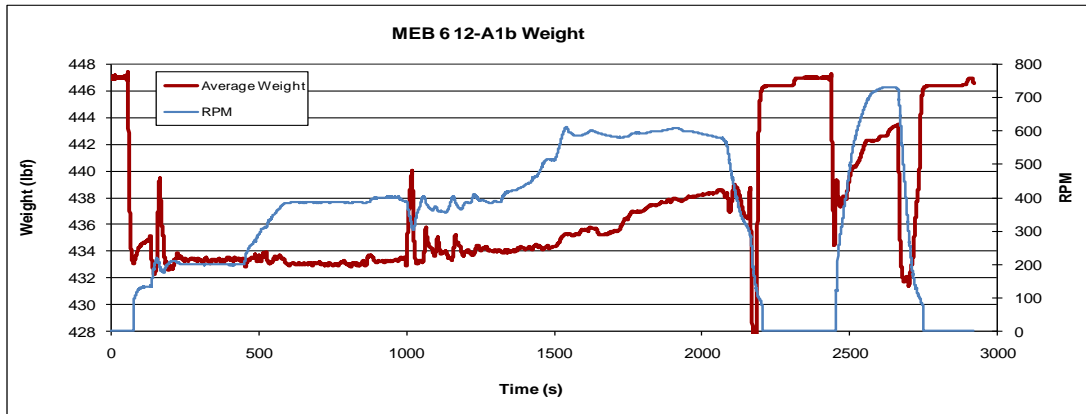
The Poynting vector \bar{S} is a components of the GEM or Gravito-Electro-Magnetic Theory [3]. The premise for deriving a Poynting conservation field [4, 5] is that both the electric and magnetic fields are wave equations. If so, the Poynting vector also must satisfy a wave equation. Moreover, these terms are derived to include effects based upon the curl of the curl vector to show the impact of rotational effects demonstrated by the Morningstar Energy Box or with a spiral trajectory [6] for this effort that may be of importance.

The original device that cost with R&D and manufacturing about \$450,000 and looks like:



Results

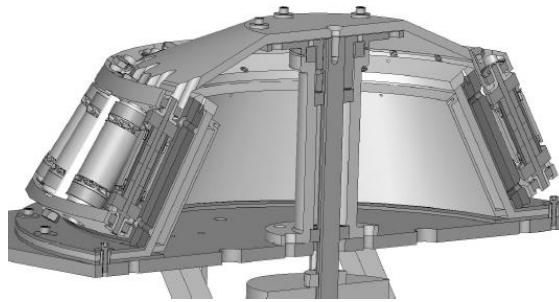
The initial weight includes the device, cabinet, and supporting equipment. The weight shown in Figure 13 first dropped from 447 pounds to 433 pounds. A weight spike at about 2180 seconds dropped to 425 pounds. The weight returned to the initial weight and then, at a different direction, dropped a minimum of 431 pounds. A maximum weight loss occurred at 22 pounds at about 12%, and an average loss in direction was 14 pounds at 7.3%. The initial objective of this run was designed to establish resonances but the results changed weight right away.



This represents unusual weight history as a function of time.

Success of these runs encouraged us to pursue and complete the manufacture of a tapered ring system. After these different tests and results, a variant device would explore these ideas for further changes in weight reduction situations.

Proposed Activity



. The Tapered Ring Device- A future reality that could reduce more weight.

Morningstar proposes an activity to examine the original configuration and perform tests to see if results are reproducible. Moreover, additional data could provide insights to understand why the system lost weight. Once achieved, we intend to perform three separate tests using the above tapered configuration. Based upon the orientation, this system should generate a stronger vortex to play a larger role in the M-B equation regarding intensity in the Poynting field. Results should have reduced weight more than the 7% value previously determined. If successful, the device might have space propulsion implications.

3. References

- [1] Murad, P. A., Boardman, M. J., Brandenburg, J. E., McCabe, J., and Mitzen. W., “The Morningstar Energy Box,” **AIAA-2012-0998**, 50th AIAA Aerospace Sciences Meeting, Nashville, Tennessee, 9-12 January 2012. This was also presented at STAIF II in 2013.
- [2] Murad, P. A., Boardman, M. J., Brandenburg, J. E., McCabe, J., and Mitzen. W., “Experiments and Theoretical Investigations of The Morningstar Energy Box”, SAP 2013.
- [3] Brandenburg, J. E. and Kline, J. F., Application of the GEM theory of Gravity-Electro-Magnetism Unification to the Problem of Controlled Gravity, Theory and Experiment, presented at the 34th Joint Propulsion Conference & Exhibit, **AIAA 98-3137**, 1998.
- [4] Murad, P. A., Brandenburg, J. E., “The Murad-Brandenburg Poynting Field Conservation Equation and Gravity”, SAP Journal 2012, presented at STAIF II in 2011 and presented at the 48th AIAA Aerospace Sciences Meeting, 2010.
- [5] Murad, P. A., Brandenburg, J. E.: “The Murad-Brandenburg Equation- A Wave Partial Differential Conservation Expression for the Poynting Vector/Field”, 50th AIAA Aerospace Sciences Meeting, **AIAA 2012-0997**, 9-12 January 2012, Nashville, Tennessee.
- [6] Murad, P. A., Brandenburg, J., “An Extension of the Murad-Brandenburg Poynting Field Conservation Equation and Possible Gravity Law ‘, presented at STAIF II in New Mexico, April 2014.

Morningstar looks forward and feels very comfortable to perform this task as well as support the technology culture of NASA. If there are any questions on this proposal, feel free to contact the CEO Paul Murad at 703 759-2028.

*Morningstar Applied Physics, LLC.
Attn: Mr. P. A. Murad
1441 Montague Drive
Vienna, Va. 22182.*