



Broad Agency Announcement
Terahertz Electronics
Microsystems Technology Office
DARPA-BAA-08-51

06/13/2008

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Part One: Overview Information

- **Federal Agency Name** – Defense Advanced Research Projects Agency (DARPA), Microsystems Technology Office (MTO)
- **Funding Opportunity Title** – Terahertz Electronics
- **Announcement Type** – Initial Broad Agency Announcement (BAA)
- **Funding Opportunity Number** – **DARPA-BAA-08-51**
- **Catalog of Federal Domestic Assistance Numbers (CFDA)** – 12.910 Research and Technology Development
- **Dates**
 - Proposal Abstract Due Date – 4pm EDT 07-14-2008
 - Proposal Due Date – 4pm EDT 08-29-2008
- **Concise description of the funding opportunity** - DARPA is soliciting innovative research proposals in Terahertz (THz) Electronics. Proposed research should investigate innovative approaches that enable revolutionary advances in electronic devices and integrated circuits achieving THz frequencies (at least 1.0×10^{12} cycles per second). Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.
- **Anticipated individual awards** – Multiple awards are anticipated.
- **Types of instruments that may be awarded** -- Procurement contract, grant, cooperative agreement or other transaction.
- **Agency contact**
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Part Two: Full Text of Announcement

I. FUNDING OPPORTUNITY DESCRIPTION

The Defense Advanced Research Projects Agency often selects its research efforts through the Broad Agency Announcement (BAA) process. The BAA will appear first on the FedBizOpps website, <http://www.fedbizopps.gov/>, and Grants.gov website at <http://www.grants.gov/>. The following information is for those wishing to respond to the BAA.

DARPA is soliciting innovative research proposals for the development of Terahertz (THz) Electronics devices and integrated circuits. Proposed research should investigate innovative approaches that enable revolutionary advances in electronic devices and integrated circuits resulting in their ability to operate at THz frequencies (at least 1.0×10^{12} cycles per second). Specifically excluded is research that primarily results in evolutionary improvements to the existing state of practice.

A. Background and Description

The sub-millimeter wave (sub-MMW) frequency band between 0.3 to 3 THz has historically been extremely difficult to access due to a lack of effective means to generate, detect, process, and radiate radio-frequency (RF) signals. The range of potential applications associated with the sub-MMW band is nonetheless extensive, including imaging, radar, spectroscopy, and communications. Common to these and other applications is the critical need for greatly improved THz transmitter and receiver technologies. For transmitters, the primary need is the development of higher power sources and amplifiers with acceptable wall-plug efficiency, instantaneous bandwidth, and gain in order to enable practical military systems. For receivers, which have attracted markedly less attention (apart from cryogenic detectors), a tremendous opportunity exists to enable dramatic improvements in system performance including improved noise figure and phase noise characteristics. Relative to bolometers, Schottky diodes, and other conventional “direct” (rectifying) detector approaches, enormous signal-to-noise ratio improvements (70dB or more) could be realized through spectral filtering and phase coherent processing techniques such as those commonly used at RF and microwave frequencies. These include, but are not necessarily limited to, the use of coherent heterodyne processing in which the relative phases of transmit and receive signals are exploited.

Coherent heterodyne processing is facilitated at lower RF frequencies by the development of microwave monolithic integrated circuits (MMICs), in which all requisite circuit elements are integrated into a compact circuit. Such circuits are also amenable to integration into arrays including, for example, RF active electronic scanning arrays. While MMICs may contain a variety of active (and on-chip passive) components, they generally use transistors as their active devices. Historically, the unity-current-gain frequency (f_t) and maximum oscillation frequency (f_{max}) of transistor devices have been well below this sub-MMW band, precluding the use of transistor electronics for

applications in this frequency range. Electronic approaches in this band have, therefore, been dominated by two-terminal devices, such as Schottky diodes, and by vacuum electronic approaches, such as backward wave oscillators, klystrons, and gyrotrons. Neither of these approaches is attractive for the realization of compact integrated circuits.

Significant progress has recently been made in increasing the maximum frequency of operation of transistor electronics. Several DARPA programs, including TFAST, SWIFT, and TEAM, have been instrumental in this development. For example, InP heterojunction bipolar transistors (HBT) have recently achieved room-temperature f_t values approaching 0.8THz. Progress has also been made with high-speed field effect transistors, such as InP High Electron Mobility Transistors (HEMTs), including a reported value for f_{max} that exceeds 1.0THz. While these results are impressive, the theoretical limit of the speed of transistors, though incompletely understood, appears to be well beyond 1THz for the highest performance materials and device structures.

As an example, the limit of the speed of a HBT device is known to depend on the time required for a carrier to transit the base and collector regions as well as on the RC charging time. Aggressive scaling of device dimensions to reduce transit and charging times clearly offers a way to achieve higher cutoff frequencies and THz operation. Because increasing the HBT frequency necessitates correspondingly increasing the current densities, such scaling is extremely challenging as each reduction of device dimensions demands commensurate reduction of parasitic impedances, particularly emitter resistivity. Additionally, since current densities of HBT devices scale inversely with device dimensions, thermal management and other design issues assume enormous importance.

As suggested above, a significant shortcoming of THz electronics has been the lack of high density integrated circuit technology. For instance, state-of-the-art cascaded frequency multiplier chains typically use single devices that are packaged into large, hand-machined blocks interconnected by waveguides using custom-fabricated transitions. The size, weight, and cost of such structures prohibit their use in many applications. Achieving the far higher level of integration needed to enable practical THz systems, such as arrays, will require innovative methods for integrating devices into compact circuits. Low-loss interconnects between circuit elements are essential for achieving acceptable performance from these systems. Sub-MMW integrated circuits have recently been demonstrated, but these circuits operate at frequencies well below 1.0THz.

Recently, compact, micromachined vacuum electronic devices have made it possible to produce compact and relatively high power sub-MMW sources. This technology offers one possible path to achieving efficient THz transmitters, but significant hurdles remain. The most obvious such hurdle is the complex and difficult frequency scaling required for this technology to achieve 1.0THz operation. Moreover, phase-sensitive transmit / receive (TR) systems typically require high power amplifiers (HPAs), not free-running sources. At THz frequencies, integration of an HPA with a first-stage exciter in a relatively compact assembly represents a formidable challenge, but has enormous payoff.

B. Program Objective

The objective of the THz Electronics program will be to develop the critical device and integration technologies necessary to realize compact, high-performance electronic circuits that operate at center frequencies exceeding 1.0 THz. Accomplishment of this goal will be validated through the demonstration of specific Program Test Circuits (see “Deliverables” below).

C. Technical Areas of Interest

DARPA seeks innovative proposals in the following two Technical Areas of Interest. **A single proposal may address only one Technical Area of Interest, but is required to address that Area in a comprehensive manner. *Proposers wishing to address both Technical Areas of Interest should submit separate proposals for each Area. Proposals that address more than one Technical Area of Interest will be considered not responsive.***

Technical Area I: Terahertz Transistor Electronics. This Area will develop and demonstrate technologies for transistor devices and integrated circuits operating at THz frequencies. These include:

1. ***THz Transistors.*** The proposer will demonstrate transistors with performance sufficient to meet the requirements of the Program’s Test Circuits, which are: (a) a THz Exciter Circuit, (b) a THz Receiver Circuit Module, and (c) a Dynamic THz Frequency Divider. Proposers should identify the unity-current-gain frequency (f_t) and maximum oscillation frequency (f_{max}) that these Test Circuits will require and should identify a path by which transistor performance can be scaled to achieve the required f_t and f_{max} goals for each Program Phase. Proposers should describe a process (or processes) for realizing these active devices, including strategies for mitigation of parasitic impedances and addressing thermal management requirements. Approaches may include, but are not limited to, Heterojunction Bipolar Transistors (HBT) and High Electron Mobility Transistors (HEMT). The specific semiconductor material(s) in which these devices will be fabricated (e.g., InP, GaAs, GaN, Si, SiGe, or other semiconductor alloy) should be clearly stated. Models of the transistors that provide accurate values of all relevant performance parameters at the frequencies of interest should be developed and validated.
2. ***THz Monolithic Integrated Circuits.*** The proposer will develop a process to construct THz monolithic integrated circuits (TMICs) that meet the performance and yield metrics of the program. This will include a strategy for producing on-chip RF interconnects, with requisite low-loss propagation characteristics, compatible with integration into a monolithic process. The performance characteristics (e.g., insertion loss) of these interconnects will be measured and modeled. The proposer will develop a process to link THz active devices with passive components using low loss THz interconnects to

form high-performance monolithic subcircuits. This approach must be appropriate for use with batch fabrication methods that provide a reasonable manufacturing yield. The specific TMICs to be demonstrated (e.g., low noise amplifiers, mixers) will be specified by the proposer, but will include the subcircuit elements required to realize the Program's Test Circuits. Performance models of the TMIC circuits at the frequencies of interest should be developed and validated.

3. ***THz Inter-Element Interconnects.*** The proposer will develop an approach to achieve low-loss, high-frequency interconnections between TMIC elements compatible with integration into microelectronic circuit modules. Such an approach might involve (but is not limited to) the use of micromachined waveguides and transition elements. The performance characteristics (e.g., insertion loss) of these interconnects will be measured and modeled.
4. ***THz Circuit Integration.*** The proposer will develop a process to combine THz active devices, passive components, TMICs, and THz inter-element interconnects to form high-performance microelectronic circuit modules. The approach may be monolithic, an assembly, or any combination of these, but must be compatible with batch fabrication methods. As necessary, methods that insure precise alignment and interconnect tolerances should be developed. The approach developed must be capable of achieving, with reasonable manufacturing yield, the level of complexity required to realize the Program Test Circuits.
5. ***THz Test Circuit.*** The proposer will develop approaches for realizing the required Program Test Circuits that have performance consistent with meeting the program's metrics (see section D below). For the THz Exciter, the circuit approach should provide a mechanism for low-loss integration of the exciter with a high power amplifier. For the THz Receiver Circuit, the module should include an antenna that enables THz signals to be efficiently coupled from free space. The selected integration approach should be compatible with the development of receiver arrays whose elements are separated by distances on the order of the carrier frequency.
6. ***THz Metrology.*** The proposer will develop methods for testing transistor devices and circuits at THz frequencies as required and, in particular, will develop and implement a test plan to validate performance of Program Test Circuits relative to program goals. The approach proposed should describe the selected strategy for producing low-loss fixtures and transitions that allow testing of devices and circuits at frequencies to ~1.0THz. Innovative means must be developed to overcome the lack of automated THz test equipment and to minimize turnaround time.

Technical Area II: Terahertz High Power Amplifier (HPA) Modules. This Area will address technologies for high power amplification of a THz signal in compact modules. These include:

1. ***THz Power Amplifiers.*** The proposer will demonstrate a power amplifier device capable of amplifying radiation at THz frequencies. Approaches may include, but are not limited to, vacuum electronic devices (such as travelling wave tubes and extended interaction klystrons) or photonic amplifiers, but must be compact and amenable to integration with solid-state exciters. Device performance characteristics will be consistent with the program metrics (see section D below) taking into account predicted losses when the devices are integrated into an assembly. **Note that high-power sources (as opposed to amplifiers) are not responsive to this BAA.**
2. ***Compact THz HPA Module.*** The proposer will develop approaches for realizing the Program Test Circuit that has performance consistent with the program metrics (see section D below). The module will include an antenna that facilitates efficient coupling of THz signals to free space. The module should be designed for integration with a solid-state exciter such as that described in Technical Area I.
3. ***THz Metrology.*** The proposer will develop means of testing power amplifiers at THz frequencies to validate their performance relative to program goals. The proposed approach should describe the plan for implementing low-loss fixtures and transitions that allow testing of devices and circuits at up to 1.0THz. Innovative means will be developed to overcome the lack of automated THz test equipment and to minimize turnaround time.

D. Program Organization and Metrics

The program will be conducted in three Phases, each having definite, measurable metrics, the most critical of which are designated as Go/No-Go (GNG) Metrics.

Programmatically, the principal difference between Phases is the center operating frequency of the key deliverables described in Section E below. The center operating frequencies for these test circuits will be 0.67, 0.85, and 1.03 THz for Phases I, II, and III, respectively.

Each Phase will culminate in specified demonstration(s), which will serve to validate that the goals of that Phase have been achieved and that the performer has met the GNG metrics. Proposers should describe, in detail, within their proposal how they plan to evaluate the demonstration circuits so that they can validate that they have met the GNG requirements. Performers are expected to meet or exceed **all** GNG Metrics shown in Table 1 by the conclusion of each Phase. Proposers may, at their option, propose more ambitious values for any of the GNG Metrics than those indicated in Table 1. In general, proposals committing to the most aggressive GNG Metrics in each Phase will be

preferred, provided that the risk in delivering the stated metrics, as described in the proposal, is considered reasonable by the reviewers.

In addition to GNG Metrics, bidders are requested to propose additional metrics (“Proposer-Defined Metrics”). Several representative examples are provided in Table 1. Such metrics may be specific to the particular approach and should provide insight into some of the secondary performance goals, particularly device goals, expected to be met by the end of each Phase consistent with achieving the program GNG Metrics.

Metric		Unit	Phase I	Phase II	Phase III
GNG Metrics					
	Center Operating Frequency	GHz	670⁽¹⁾	850⁽¹⁾	1030⁽¹⁾
Exciter/Receiver	Exciter P_{out}	dBm	4	2	0
	Exciter Phase Noise⁽²⁾	dBc/Hz	-33	-30	-27
	Exciter Modulation Bandwidth	GHz	15	15	15
	Exciter Slew Rate	GHz/ms	15	15	15
	Receiver NF	dB	12	12	12
	Receiver Instantaneous Bandwidth⁽³⁾	GHz	15	15	15
	RF Yield⁽⁴⁾	%	50	50	50
HPA	P_{out}⁽⁵⁾	dBm	18	14	10
	Power Added Efficiency	%	0.75	0.5	0.2
	Instantaneous Bandwidth⁽³⁾	GHz	15	15	15
	Gain	dB	20	18	16
Proposer-Defined Metrics (Representative Examples)					
Exciter/Receiver	Transistor Ft	THz	0.9	1.1	1.35
	Transistor Fmax	THz	1.2	1.5	1.8
	LNA gain	dB	20	20	20
	Mixer Conversion Loss	dB	12	12	12
	Waveguide Loss	dB/mm	0.2	0.2	0.2
	Receiver Module Volume	mm³	5	3.5	2
HPA	THz Power Module Volume	mm³			
	Antenna Insertion Loss	dB	1	1	1
	IP3	dB			

- (1) All metrics in a given Phase must be met at this frequency
- (2) At 100Hz offset
- (3) Values shown are minimum; bidders are encouraged to propose greater values
- (4) RF Yield determined by fraction of test circuits across a test wafer meeting pass criteria. Test circuit: dynamic frequency divider circuit operating at the specified frequency for that Phase, with a divide ratio of at least 2:1 and with an input power not to exceed 80% of the proposed Exciter P_{out}. Pass criteria: (a) measured clock frequency at least 80% of specified target; and (b) measured bandwidth (clock frequency range) at least equal to the proposed Exciter Modulation Bandwidth.
- (5) At least 50% duty cycle

Proposers must define a realistic schedule and budget that meets the metric and deliverable requirements. The proposed period of performance for each of these Phases and metric schedule will be included by Proposers within their technical proposals and will be factors considered as part of the source selection process (see below). In general, shorter Phases are preferable, but each Phase should clearly be adequate in duration to meet its objectives, assuming reasonable risks and at a reasonable cost. Proposals should discuss plans for managing these factors. Program plans should include Proposer-Defined Metrics every six months.

E. Deliverables

The primary deliverables for each Phase of the THz Electronics program will be the experimental demonstrations at the center frequency required for that Phase as described above, including:

Technical Area I: Terahertz Transistor Electronics

- **THz Exciter Circuit** capable of producing a THz RF output by frequency upconverting local oscillator (LO) and intermediate frequency (IF) inputs. The performer will specify a scheme by which this frequency conversion will occur (which could involve any specified combination of, for example, frequency multipliers, mixers, amplifiers, etc.). The RF output of the Exciter Circuit will have a frequency determined by the LO and IF input frequencies and modulation characteristics (phase, frequency, or amplitude) of the IF input. IF and LO inputs may be produced off-chip, but should not exceed a frequency of 120 GHz.
- **THz Receiver Circuit Module** containing an antenna integrated and circuit elements necessary to collect and downconvert a modulated THz RF signal into an IF output (at a frequency no higher than 120 GHz), given an input LO signal equivalent to that used in the THz Exciter. While the receiver circuit need only be a single element, the proposers should show how the approach is consistent with integration into multi-element receiver arrays with antenna spacing of order of the center frequency wavelength.
- **Dynamic Frequency Divider Circuit** operating with its fundamental input at the THz RF frequency, with a divide ratio of at least 2:1.

Technical Area II: Terahertz High Power Amplifiers (HPAs)

- **Compact THz HPA Module** containing a broadband and efficient amplifier, meeting or exceeding the GNG metrics in Section D, with input coupled to a suitable THz RF input port, and output coupled to an integrated compact antenna to efficiently radiate the THz RF output signal.

The performer should deliver the demonstration devices (or copies thereof) along with a description of the test equipment and test procedures necessary to enable the government to conduct independent test and evaluation.

In addition to these items, deliverables should include intermediate reports at quarterly intervals and a final technical report, which will include the transition plan.

II. AWARD INFORMATION

Multiple awards are anticipated. The amount of resources made available under this BAA will depend on the quality of the proposals received and the availability of funds.

The Government reserves the right to select for negotiation all, some, one, or none of the proposals received in response to this solicitation, and to make awards without discussions with proposers. The Government also reserves the right to conduct discussions if the Source Selection Authority later determines them to be necessary. If warranted, portions of resulting awards may be segregated into pre-priced options. Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of proposals for award. In the event that DARPA desires to award only portions of a proposal, negotiations may be opened with that proposer. If the proposed effort is inherently divisible and nothing is gained from the aggregation, proposers should consider submitting it as multiple independent efforts. The Government reserves the right to fund proposals in phases with options for continued work at the end of one or more of the phases. Further, DARPA reserves the right to select all, some, one or none of the proposals received in either or both Technical Areas.

Awards under this BAA will be made to proposers on the basis of the evaluation criteria listed below (see section labeled “Application Review Information”, Sec. V.), and program balance to provide overall value to the Government. Proposals identified for negotiation may result in a procurement contract, grant, cooperative agreement, or other transaction depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. Award of such instruments is contingent on availability of funding.

III. ELIGIBILITY INFORMATION

A. Eligible Applicants

All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCUs), Small Businesses, Small Disadvantaged Businesses and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals; however, no portion of this announcement will be set aside for these organizations' participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities. Independent proposals from Government/National laboratories may be subject to applicable direct competition limitations, though certain Federally Funded Research and Development Centers are excepted per P.L. 103-337§ 217 and P.L 105-261 § 3136. Proposers from Government/ National Laboratories must provide documentation to DARPA to establish

that they are eligible to propose and have unique capabilities not otherwise available in private industry.

Foreign participants and/or individuals may participate to the extent that such participants comply with any necessary Non-Disclosure Agreements, Security Regulations, Export Control Laws, and other governing statutes applicable under the circumstances.

1. Procurement Integrity, Standards of Conduct, Ethical Considerations, and Organizational Conflicts of Interest

Current federal employees are prohibited from participating in particular matters involving conflicting financial, employment, and representational interests (18 USC 203, 205, and 208.). The DARPA Program Manager for this BAA is Mark Rosker. As of the date of first publication of the BAA, the Government has not identified any potential conflicts of interest involving this program manager. Once the proposals have been received, and prior to the start of proposal evaluations, the Government will assess potential conflicts of interest and will promptly notify the proposer if any appear to exist. (Please note the Government assessment does NOT affect, offset, or mitigate the proposer's own duty to give full notice and planned mitigation for all potential organizational conflicts, as discussed below.) The Program Manager is required to review and evaluate all proposals received under this BAA and to manage all selected efforts. Proposers should carefully consider the composition of their performer team before submitting a proposal to this BAA.

All Proposers and proposed subcontractors must affirm whether they are providing scientific, engineering, and technical assistance (SETA) or similar support to any DARPA technical office(s) through an active contract or subcontract. All affirmations must state which office(s) the Proposer supports and identify the prime contract numbers. Affirmations shall be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest (FAR 9.5) must be disclosed. The disclosure shall include a description of the action the Proposer has taken or proposes to take to avoid, neutralize, or mitigate such conflict. In accordance with FAR 9.503 and without prior approval or a waiver from the DARPA Director, a Contractor cannot simultaneously be a SETA and Performer. Proposals that fail to fully disclose potential conflicts of interests and/or do not have plans to mitigate this conflict will be returned without technical evaluation and withdrawn from further consideration for award.

If a prospective Proposer believes that any conflict of interest exists or may exist (whether organizational or otherwise), the Proposer should promptly raise the issue with DARPA by sending Proposer's contact information and a summary of the potential conflict by email to the mailbox address for this BAA at BAA08-51@darpa.mil, before time and effort are expended in preparing a proposal and mitigation plan. If, in the sole opinion of the Government after full consideration of the circumstances, any conflict situation cannot be effectively mitigated, the proposal may be returned without technical evaluation and withdrawn from further consideration for award under this BAA.

B. Cost Sharing/Matching

Cost sharing is not required for this particular program; however, cost sharing will be carefully considered where there is an applicable statutory condition relating to the selected funding instrument (e.g., for any Other Transactions under the authority of 10 U.S.C. § 2371). Cost sharing is encouraged where there is a reasonable probability of a potential commercial application related to the proposed research and development effort.

C. Other Eligibility Criteria (optional)

1. Collaborative Efforts

Collaborative efforts/teaming are encouraged. A website, (www.davincinetbook.com/teams), has been established to facilitate formation of teaming arrangements between interested parties. Specific content, communications, networking, and team formation are the sole responsibility of the participants. Neither DARPA nor the Department of Defense (DoD) endorses the destination web site or the information and organizations contained therein, nor does DARPA or the DoD exercise any responsibility at the destination. This website is provided consistent with the stated purpose of this BAA.

IV. APPLICATION AND SUBMISSION INFORMATION

A. Address to Request Application Package

This solicitation contains all information required to submit a proposal. No additional forms, kits, or other materials are needed. This notice constitutes the total BAA. No additional information is available, nor will a formal Request for Proposal (RFP) or additional solicitation regarding this announcement be issued. Requests for same will be disregarded.

B. Content and Form of Application Submission

1. Abstract and Proposal Information

Proposers who choose to use abstracts are strongly encouraged to submit a proposal abstract in advance of a full proposal. This procedure is intended to minimize unnecessary effort in proposal preparation and review. The time and date for submission of proposal abstracts is specified in Section C below. DARPA will acknowledge receipt of the submission and assign a control number that should be used in all further correspondence regarding the proposal abstract.

DARPA will respond to proposal abstracts with a statement as to whether DARPA is interested in the idea. DARPA will attempt to reply to proposal abstracts within thirty (30) calendar days of receipt. Proposal abstracts will be reviewed in the order they are received. Early submissions of proposal abstracts and full proposals are strongly

encouraged because selections may be made at any time during the period of solicitation. Regardless of DARPA's response to a proposal abstract, proposers may submit a full proposal. DARPA will review all full proposals submitted using the published evaluation criteria and without regard to any comments resulting from the review of a proposal abstract.

Proposers are required to submit full proposals by the time and date specified in the BAA in order to be considered during the initial round of selections. DARPA may evaluate proposals received after this date for a period up to one year from date of posting on FedBizOpps and Grants.gov. Evaluation outcome notwithstanding, consideration and/or selection remains contingent on availability of funds.

A single proposal may address only one Technical Area of Interest, but is required to address that Area in a comprehensive manner. *Proposers wishing to address both Areas of Interest should submit separate proposals for each Area. Proposals that address more than one Technical Area of Interest will be considered not responsive.*

Restrictive notices notwithstanding, proposals may be handled, for administrative purposes only, by a support contractor. This support contractor is prohibited from competition in DARPA technical research and is bound by appropriate nondisclosure requirements.

Proposals not meeting the format described in the BAA may not be reviewed.

For Proposers Posting to Grants.Gov:

Proposers may elect to use the Grants.gov APPLY function if the applicant is seeking a grant or cooperative agreement. The APPLY function replaces the proposal submission process that other proposers follow. The APPLY function does not affect the proposal content or format. The APPLY function is electronic; proposers do not submit paper proposals in addition to the Grants.gov APPLY electronic submission.

For All:

All administrative correspondence and questions on this solicitation, including requests for information on how to submit a proposal abstract or full proposal to this BAA, should be directed to BAA08-51@darpa.mil. DARPA intends to use electronic mail for correspondence regarding BAA 08-51. Proposals and proposal abstracts may not be submitted by fax or e-mail; any so sent will be disregarded. DARPA encourages use of the Internet for retrieving the BAA and any other related information that may subsequently be provided.

For Proposers Submitting proposals through T-FIMS:

Proposals sent in response to DARPA-BAA-08-51 must be submitted through T-FIMS. Attached to this BAA is a document entitled "T-FIMS Instructions for Proposers" (see

Attachment 1). A thorough read of this section guarantees successful submission to T-FIMS and explains all the necessary steps to submitting proposals through T-FIMS. Because proposers using T-FIMS may encounter heavy traffic on the web server, and T-FIMS requires a registration and certificate installation for all proposers, proposers should not wait until the day the proposal is due to create an account in T-FIMS and submit the proposal. All proposers using T-FIMS must also encrypt the proposal, as per the instructions below.

All proposals submitted electronically by means of T-FIMS must be encrypted using Winzip or PKZip with 256-bit AES encryption. Only one zipped/encrypted file will be accepted per proposal and proposals not zipped/encrypted will be rejected by DARPA. An encryption password form must be completed and emailed to BAA08-51@darpa.mil at the time of proposal submission. See <https://www.tfims.darpa.mil/baa/> for the encryption password form.

Note the word "PASSWORD" must appear in the subject line of the above email and there are minimum security requirements for establishing the encryption password. Failure to provide the encryption password may result in the proposal not being evaluated. For further information and instructions on how to zip and encrypt proposal files, see <https://www.tfims.darpa.mil/baa/>.

2. Proposal Abstract Format

Proposal abstracts are encouraged in advance of full proposals in order to provide potential offerors with a rapid response and to minimize unnecessary effort. Proposal abstracts should follow the same general structure described for Volume I (see section II & III), but are expected to provide a concise summary rather than extensive detail. The proposal abstract should provide schedule and cost information. The maximum page lengths for each section shown in braces { } below can be neglected; however, **the total length excluding the cover sheet shall not exceed ten (10) pages**. The cover sheet should be clearly marked "PROPOSAL ABSTRACT." All pages shall be formatted to 8-1/2 by 11 inch paper with type not smaller than 12 point. The page limitation for proposal abstracts includes all figures, tables, and charts. No formal transmittal letter is required. All proposal abstracts must be written in English.

3. Full Proposal Format

All full proposals must be in the format given below. Nonconforming proposals may be rejected without review. Proposals shall consist of two volumes. All pages shall be formatted for 8-1/2 by 11 inch paper with type not smaller than 12 point. Smaller font may be used for figures, tables and charts. The page limitation for full proposals includes all figures, tables, and charts. Volume I, Technical and Management Proposal, may include an attached bibliography of relevant technical papers or research notes (published and unpublished) which document the technical ideas and approach upon which the proposal is based. Copies of not more than three (3) relevant papers can be included with the submission. The bibliography and attached papers are not included in the page counts given below. The submission of other supporting materials along with the proposals is

strongly discouraged and will not be considered for review. Except for the attached bibliography and Section I, **Volume I shall not exceed fifty-five (55) pages**. Maximum page lengths for each section are shown in braces { } below. All full proposals must be written in English.

4. Volume I, Technical and Management Proposal

Section I. Administrative

A. Cover sheet to include:

- (1) BAA number (BAA 08-51)
- (2) Technical area
- (3) Lead Organization Submitting proposal
- (4) Type of business, selected among the following categories: “LARGE BUSINESS”, “SMALL DISADVANTAGED BUSINESS”, “OTHER SMALL BUSINESS”, “HBCU”, “MI”, “OTHER EDUCATIONAL”, OR “OTHER NONPROFIT”
- (5) Contractor’s reference number (if any)
- (6) Other team members (if applicable) and type of business for each
- (7) Proposal title
- (8) Technical point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available)
- (9) Administrative point of contact to include: salutation, last name, first name, street address, city, state, zip code, telephone, fax (if available), electronic mail (if available), total funds requested from DARPA, and the amount of cost share (if any) and
- (10) Date abstract/proposal was submitted.

B. Official transmittal letter.

Section II. Executive Summary

{3} This section should provide a clear and concise summary of the following:

- Identification of key technical challenges
- A description of the unique technical solutions and approaches being proposed
- Innovative claims for the proposed programs
- Comparison with current state-of-the-art and to alternate approaches
- Quantitative, end-of-program performance goals and the Proposer-Defined Metrics and GNG Metrics associated with the development effort (table)
- Technology transfer path.
- Contractor capabilities, experience and past achievements that support the contention that the contractor can meet the program’s goals
- Budget summary by task and calendar year (table)

Section III. Detailed Proposal Information

This section provides the detailed discussion of the proposed work necessary to enable an in-depth review of the specific technical and managerial issues. Specific attention must

be given to addressing both risk and payoff of the proposed work that make it desirable to DARPA.

- A. {20} **Technical Approach & Rationale.** This section should: (1) identify the key technical challenges to realizing the goals of the THz Electronics program, (2) present a description of the innovative technical solutions and approaches being proposed, and (3) provide a clear rationale as to what makes the selected approach advantageous. This section should demonstrate that the proposer has a clear and comprehensive understanding of the state-of-the-art of relevant electronic devices, circuits, integration approaches, simulation and design, and test. It should provide sufficient technical detail to permit full evaluation of the feasibility of the proposed technical approach.
- B. {9} **Program Plan & Risk Assessment.** A narrative explaining the explicit timelines and quantitative metrics by which progress toward the proposed goals can be evaluated. Metrics (including both Proposer-Defined Metrics and GNG Metrics) should be presented in a tabular form. The narrative plan should include a specific test plan detailing how all metrics will be accurately measured. The proposed period of performance of the overall program should be clearly stated. Performance metrics must be associated with demonstrable, quantitative measures of performance, and should be summarized in a single table. Periodic, **Proposer-Defined Metrics should be stated for each six month period beginning six months after the start of the effort.** This section should also include a description of the major technical risk elements specific to the proposed approach, an estimate of the risk magnitude for each such element, and specific plans to mitigate each risk. Proposers should clearly define all deliverables associated with the proposed research; all proprietary assertions to intellectual property of all types, including any background inventions, should be set forth in detail. (See VI.B.2, Intellectual Property.)
- C. {3} **Teaming & Management Plan.** A management plan that describes how the different members of the team will collaborate to demonstrate viable solutions to the program challenges, including formal teaming agreements which are required to execute this program.
- D. {3} **Technology Transfer Path.** Description of the results, products, transferable technology, and expected technology transfer path. The discussion should highlight the specific classes of systems expected to benefit from the technology developments and the advantages that will be afforded from their use. See also VI (C)(2) "Intellectual Property."
- E. {4} **Capabilities and Accomplishments.** A section describing relevant prior work, the background, qualifications and relevant experience of key individuals to be assigned to the program and the facilities and equipment to be utilized. This section should provide clear evidence that the contractor has the experience, personnel and capabilities required to meet the program's goals. Please do not attach supporting material (CDs, movies, etc.) to the proposal, except as noted in Section IV below.
- F. {1} **Cost Summary.** Cost schedules for the proposed research, including estimates of cost for each task in each year of the effort delineated by the primes

and major subcontractors, total cost, and any company cost share. Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each.

G. {7} **Statement of Work (SOW).** In plain English, clearly define the technical tasks/subtasks to be performed, their durations, and dependencies among them. The page length for the SOW will be dependent on the amount of the effort. The SOW must not include proprietary information. For each task/subtask, provide:

- A general description of the objective (for each defined task/activity);
- A detailed description of the approach to be taken to accomplish each defined task/activity);
- Identification of the primary organization responsible for task execution (prime, sub, team member, by name, etc.);
- The facilities and key personnel that will be assigned to accomplish each defined task
- The exit criteria for each task/activity - a product, event or milestone that defines its completion.
- Define all deliverables (reporting, data, reports, software, etc.) to be provided to the Government in support of the proposed research tasks/activities.

*Note: It is recommended that the SOW should be developed so that each Phase of the program is separately defined. **Do not include any proprietary information in the SOW***

H. {5} **Slide Summary.** PowerPoint-type slides (i.e., landscape formatted for presentation) that succinctly highlight the major aspects of the proposal in a manner suitable for presentation to DARPA management. These must include an overview slide highlighting all the important aspects of the chosen approach, system-level benefits resulting from them, device challenges and the approach to meeting these challenges. Other slides should provide information such as, but not limited to, planned demonstrations, highlights of device concepts, integration approaches, and highlights of system-level benefits. The notes section of slides may contain a concise discussion of each slide.

Section IV. Additional Information

5. Volume II, Cost Proposal – {No Page Limit}

Cover sheet to include:

- (1) BAA number;
- (2) Technical area;
- (3) Lead Organization Submitting proposal;
- (4) Type of business, selected among the following categories: “LARGE BUSINESS”, “SMALL DISADVANTAGED BUSINESS”, “OTHER SMALL BUSINESS”, “HBCU”, “MI”, “OTHER EDUCATIONAL”, OR “OTHER NONPROFIT”;
- (5) Contractor’s reference number (if any);

incorporation into the resulting award instrument (e.g., use of Government Furnished Property/Facilities/Information, access to Government Subject Matter Expert/s, etc.). The prime contractor is responsible for compiling and providing all subcontractor proposals for the Procuring Contracting Officer (PCO). Subcontractor proposals include Interdivisional Work Transfer Agreements (ITWA) or similar arrangements. If seeking a procurement contract, the prime contractor shall provide a cost reasonableness analysis of proposed subcontractor prices. Such analysis shall indicate the extent to which the prime contractor has negotiated subcontract prices. Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each. NOTE: for IT and equipment purchases, include a letter stating why the proposer cannot provide the requested resources from its own funding.

NOTE: The FY2008 Defense Appropriations Act caps indirect cost rates for any procurement contract, grant or agreement using 6.1 Basic Research FY08 Funding at 35% of the total cost of the award. Total costs include all bottom line costs. Indirect costs are all costs of a prime award that are Facilities and Administration costs (for awardees subject to the cost principles in 2 CFR part 220) or indirect costs (for awardees subject to the cost principles in 2 CFR part 225 or 230 or 48 CFR part 32). If DARPA anticipates using 6.1 funding for this effort, the Contractor must be made aware that total negotiated indirect cost rates may not exceed 35% of the total cost of the award. The cost limitations do not flow down to subcontractors. The original text of the Act can be found at Department of Defense Appropriations Act of 2008, Pub. L. No. 110-116, §8115, http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_public_laws&docid=f:pub116.110.

Supporting cost and pricing information in sufficient detail to substantiate the summary cost estimates in B. above. Include a description of the method used to estimate costs and supporting documentation. Note: “cost or pricing data” as defined in FAR Subpart 15.4 shall be required if the proposer is seeking a procurement contract award of \$650,000 or greater unless the proposer requests an exception from the requirement to submit cost or pricing data. “Cost or pricing data” are not required if the proposer proposes an award instrument other than a procurement contract (e.g., a grant, cooperative agreement, or other transaction.) All proprietary subcontractor proposal documentation, prepared at the same level of detail as that required of the prime (of which cannot be uploaded to T-FIMS), shall be made **immediately** available to the Government, **upon request**, under separate cover (i.e., mail, electronic/email, etc.), either by the Proposer or by the subcontractor organization.

C. Submission Dates and Times

1. Proposal Abstract Date

The proposal abstract must be submitted to DARPA/MTO through T-FIMS or Grants.Gov on or before 4:00 p.m., local time, July 14, 2008. Proposal abstracts received after this time and date may not be reviewed.

2. Full Proposal Date

The full proposal must be submitted to DARPA/MTO through T-FIMS or Grants.Gov on or before 4:00 p.m., local time, August 29, 2008 in order to be considered during the initial round of selections; however, proposals received after this deadline may be received and evaluated up to one year from date of posting on FedBizOpps. Full proposals submitted after the due date specified in the BAA or due date otherwise specified by DARPA after review of proposal abstracts may be selected contingent upon the availability of funds. Proposers are warned that the likelihood of funding is greatly reduced for proposals submitted after the initial closing date deadline.

DARPA will post a consolidated Question and Answer document on the DARPA/MTO/Solicitations webpage throughout the open period of the BAA and, at a minimum, by no later than 19 August 2008. In order to ensure a response to your question prior to the first round proposal due date, submit your question to the BAA Mailbox at BAA08-51@darpa.mil by no later than August 15, 2008. .

Failure to comply with the submission procedures may result in the submission not being evaluated.

D. Intergovernmental Review (if applicable)

Not Applicable.

E. Funding Restrictions

Not Applicable.

V. APPLICATION REVIEW INFORMATION

A. Evaluation Criteria

Evaluation of proposals will be accomplished through a scientific/technical review of each proposal using the following criteria, in order of descending importance: (a) Ability to meet Program Go/No-Go Metrics; (b) Overall Scientific and Technical Merit; (c) Potential Contribution and Relevance to the DARPA Mission; (d) Realism of Proposed Schedule; (e) Proposer's Capabilities and/or Related Experience; (f) Plans and Capability to Accomplish Technology Transition; and (g) Cost Realism. Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. The following are descriptions of the above listed criteria:

(a) Ability to meet program Go/No-Go Metrics

Regarding the Government defined go/no-go metrics, the feasibility and likelihood of the proposed approach for satisfying the program go/no-go metrics are explicitly described and clearly substantiated. Regarding the proposal defined metrics (those proposed in addition to the Government's defined go/no-go metrics), the proposed approach establishes clear and well defined secondary performance metrics expected to be met by the end of each phase consistent with achieving the Government's program go/no-go metrics. The proposal reflects a mature and quantitative understanding of the program go/no-go metrics, the statistical confidence with which they may be measured, and their relationship to the concept of operations that will result from successful performance in the program.

(b) Overall Scientific and Technical Merit

The proposed technical approach is feasible, achievable, complete and supported by a proposed technical team that has the expertise and experience to accomplish the proposed tasks. Task descriptions and associated technical elements provided are complete and in a logical sequence with all proposed deliverables clearly defined such that a final product that achieves the goal can be expected as a result of award. The proposal identifies major technical risks and planned mitigation efforts are clearly defined and feasible.

(c) Potential Contribution and Relevance to the DARPA Mission

The potential contributions of the proposed effort with relevance to the national technology base will be evaluated. Specifically, DARPA's mission is to maintain the technological superiority of the U.S. military and prevent technological surprise from harming our national security by sponsoring revolutionary, high-payoff research that bridges the gap between fundamental discoveries and their military use.

(d) Realism of Proposed Schedule

The proposer's abilities to aggressively pursue performance metrics in the shortest timeframe and to accurately account for that timeframe will be evaluated, as well as proposer's ability to understand, identify, and mitigate any potential risk in schedule.

(e) Proposer's Capabilities and/or Related Experience

The proposer's prior experience in similar efforts must clearly demonstrate an ability to deliver products that meet the proposed technical performance within the proposed budget and schedule. The proposed team has the expertise to manage the cost and schedule. Similar efforts completed/ongoing by the proposer in this area are fully described including identification of other Government sponsors.

(f) Plans and Capability to Accomplish Technology Transition

The capability to transition the technology to the research, industrial, and operational military communities in such a way as to enhance U.S. defense, and the extent to which intellectual property rights limitations creates a barrier to technology transition.

(g) Cost Realism

The objective of this criterion is to establish that the proposed costs are realistic for the technical and management approach offered, as well as to determine the proposer's practical understanding of the effort. This will be principally measured by cost per labor-hour and number of labor-hours proposed. The evaluation criterion recognize that undue emphasis on cost may motivate proposers to offer low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies. Cost reduction approaches that will be received favorably include innovative management concepts that maximize direct funding for technology and limit diversion of funds into overhead.

After selection and before award the contracting officer will negotiate cost/price reasonableness.

Award(s) will be made to proposers whose proposals are determined to be the most advantageous to the Government, all factors considered, including the potential contributions of the proposed work to the overall research program and the availability of funding for the effort. Award(s) may be made to any proposer(s) whose proposal(s) is determined selectable regardless of its overall rating.

NOTE: PROPOSERS ARE CAUTIONED THAT EVALUATION RATINGS MAY BE LOWERED AND/OR PROPOSALS REJECTED IF SUBMITTAL INSTRUCTIONS ARE NOT FOLLOWED.

B. Review and Recommendation Process

It is the policy of DARPA to ensure impartial, equitable, comprehensive proposal evaluations and to select the source (or sources) whose offer meets the Government's technical, policy, and programmatic goals. Pursuant to FAR 35.016, the primary basis for selecting proposals for acceptance shall be technical, importance to agency programs, and fund availability. In order to provide the desired evaluation, qualified Government personnel will conduct reviews and (if necessary) convene panels of experts in the appropriate areas.

Proposals will not be evaluated against each other since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. For evaluation purposes, a proposal is the document described in "Proposal Information", Section IV.B. Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and not considered as part of the proposal.

Restrictive notices notwithstanding, proposals may be handled for administrative purposes by support contractors. These support contractors are prohibited from competition in DARPA technical research and are bound by appropriate non-disclosure requirements.

Subject to the restrictions set forth in FAR 37.203(d), input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants /experts who are strictly bound by the appropriate non-disclosure requirements.

It is the policy of DARPA to treat all proposals as competitive information and to disclose their contents only for the purpose of evaluation. No proposals will be returned. Upon completion of the source selection process, the original of each proposal received will be retained at DARPA and all other copies will be destroyed.

VI. AWARD ADMINISTRATION INFORMATION

A. Award Notices

As soon as the evaluation of a proposal is complete, the proposer will be notified that 1) the proposal has been selected for funding pending contract negotiations, or 2) the proposal has not been selected. These official notifications will be sent via U.S. mail and electronic mail to the Technical POC identified on the proposal coversheet.

B. Administrative and National Policy Requirements

1. Security

The Government anticipates that proposals submitted under this BAA will be unclassified. In the event that a proposer chooses to submit a classified proposal or submit any documentation that may be classified, the following information is applicable. NOTE: If proposals are classified, the proposals must indicate the classification level of not only the proposal itself, but also the anticipated award document classification level.

Security classification guidance on a DD Form 254 will not be provided at this time since DARPA is soliciting ideas only. After reviewing the incoming proposals, if a determination is made that the award instrument may result in access to classified information, a DD Form 254 will be issued and attached as part of the award. Proposers choosing to submit a classified proposal must first receive permission from the Original Classification Authority to use their information in replying to this BAA. Applicable classification guide(s) should be submitted to ensure that the proposal is protected appropriately.

Classified submissions shall be in accordance with the following guidance:

Collateral Classified Information: Use classification and marking guidance provided by previously issued security classification guides, the Information Security Regulation (DoD 5200.1-R), and the National Industrial Security Program Operating Manual (DoD 5220.22-M) when marking and transmitting information previously classified by another original classification authority. Classified information at the Confidential and Secret level may only be mailed via U.S. Postal Service (USPS) Registered Mail or

U.S. Postal Service Express Mail. All classified information will be enclosed in opaque inner and outer covers and double wrapped. The inner envelope shall be sealed and plainly marked with the assigned classification and addresses of both sender and addressee. The inner envelope shall be address to:

Defense Advanced Research Projects Agency
ATTN: (Name of the Technical Office)
Reference: (BAA Number)
3701 North Fairfax Drive
Arlington, VA 22203-1714

The outer envelope shall be sealed with no identification as to the classification of its contents and addressed to:

Defense Advanced Research Projects Agency
Security & Intelligence Directorate, Attn: CDR
3701 North Fairfax Drive
Arlington, VA 22203-1714

All Top Secret materials should be hand carried via an authorized, two-person courier team to the DARPA CDR.

Special Access Program (SAP) Information: Contact the DARPA Special Access Program Central Office (SAPCO) 703-526-4052 for further guidance and instructions prior to transmitting SAP information to DARPA. Top Secret SAP, must be transmitted via approved methods for such material. Consult the DoD Overprint to the National Industrial Security Program Operating Manual for further guidance. *Prior to transmitting SAP material*, it is strongly recommended that you coordinate your submission with the DARPA SAPCO.

Sensitive Compartmented Information (SCI) Data: Contact the DARPA Special Security Office (SSO) at 703-812-1994/1984 for the correct SCI courier address and instructions. All SCI should be transmitted through your servicing Special Security Officer (SSO). SCI data must be transmitted through SCI channels only (i.e., approved SCI Facility to SCI facility via secure fax).

Proprietary Data: All proposals containing proprietary data should have the cover page and each page containing proprietary data clearly marked as containing proprietary data. It is the Proposer's responsibility to clearly define to the Government what is considered proprietary data.

Proposers must have existing and in-place prior to execution of an award, approved capabilities (personnel and facilities) to perform research and development at the classification level they propose. It is the policy of DARPA to treat all proposals as competitive information, and to disclose their contents only for the purpose of evaluation. Proposals will not be returned. The original of each proposal received will

be retained at DARPA and all other non-required copies destroyed. A certification of destruction may be requested, provided that the formal request is received at this office within 5 days after unsuccessful notification.

2. Intellectual Property

a. Procurement Contract Proposers

i. Noncommercial Items (Technical Data and Computer Software)

Proposers responding to this BAA requesting a procurement contract to be issued under the FAR/DFARS shall identify all noncommercial technical data and noncommercial computer software that it plans to generate, develop, and/or deliver under any proposed award instrument in which the Government will acquire less than unlimited rights, and to assert specific restrictions on those deliverables. Proposers shall follow the format under DFARS 252.227-7017 for this stated purpose. In the event that proposers do not submit the list, the Government will assume that it automatically has “unlimited rights” to all noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, unless it is substantiated that development of the noncommercial technical data and noncommercial computer software occurred with mixed funding. If mixed funding is anticipated in the development of noncommercial technical data and noncommercial computer software generated, developed, and/or delivered under any award instrument, then proposers should identify the data and software in question, as subject to Government Purpose Rights (GPR). In accordance with DFARS 252.227-7013 Rights in Technical Data - Noncommercial Items, and DFARS 252.227-7014 Rights in Noncommercial Computer Software and Noncommercial Computer Software Documentation, the Government will automatically assume that any such GPR restriction is limited to a period of five (5) years in accordance with the applicable DFARS clauses, at which time the Government will acquire “unlimited rights” unless the parties agree otherwise. Proposers are admonished that the Government will use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer’s assertions. If no restrictions are intended, then the proposer should state “NONE.”

A sample list for complying with this request is as follows:

NONCOMMERCIAL			
Technical Data Computer Software To be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(LIST)	(LIST)	(LIST)

ii. Commercial Items (Technical Data and Computer Software)

Proposers responding to this BAA requesting a procurement contract to be issued under the FAR/DFARS shall identify all commercial technical data and commercial computer software that may be embedded in any noncommercial deliverables contemplated under the research effort, along with any applicable restrictions on the Government’s use of such commercial technical data and/or commercial computer software. In the event that proposers do not submit the list, the Government will assume that there are no restrictions on the Government’s use of such commercial items. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions and may request additional information from the proposer, as may be necessary, to evaluate the proposer’s assertions. If no restrictions are intended, then the proposer should state “NONE.”

A sample list for complying with this request is as follows:

COMMERCIAL			
Technical Data Computer Software To be Furnished With Restrictions	Basis for Assertion	Asserted Rights Category	Name of Person Asserting Restrictions
(LIST)	(LIST)	(LIST)	(LIST)

**b. Non-Procurement Contract Proposers –
Noncommercial and Commercial Items (Technical Data
and Computer Software)**

Proposers responding to this BAA requesting a Grant, Cooperative Agreement, Technology Investment Agreement, or Other Transaction for Prototype shall follow the applicable rules and regulations governing these various award instruments, but in all cases should appropriately identify any potential restrictions on the Government’s use of any Intellectual Property contemplated under those award instruments in question. This includes both Noncommercial Items and Commercial Items. Although not required, proposers may use a format similar to that described in Paragraphs 1.a and 1.b above. The Government may use the list during the source selection evaluation process to evaluate the impact of any identified restrictions, and may request additional information from the proposer, as may be necessary, to evaluate the proposer’s assertions. If no restrictions are intended, then the proposer should state “NONE.”

c. All Proposers – Patents

Include documentation proving your ownership of or possession of appropriate licensing rights to all patented inventions (or inventions for which a patent application has been filed) that will be utilized under your proposal for the DARPA program. If a patent application has been filed for an invention that your proposal utilizes, but the application has not yet been made publicly available and contains proprietary information, you may provide only the patent number, inventor name(s), assignee names (if any), filing date,

filing date of any related provisional application, and a summary of the patent title, together with either: 1) a representation that you own the invention, or 2) proof of possession of appropriate licensing rights in the invention.

d. All Proposers – Intellectual Property Representations

Provide a good faith representation that you either own or possess appropriate licensing rights to all other intellectual property that will be utilized under your proposal for the DARPA program. Additionally, proposers shall provide a short summary for each item asserted with less than unlimited rights that describes the nature of the restriction and the intended use of the intellectual property in the conduct of the proposed research.

3. Meeting and Travel Requirements

There will be a program kickoff meeting that all key program participants will be required to attend. Performers should also anticipate periodic site visits at the Program Manager's discretion and periodic program reviews that may be held in the Washington, DC area, at the contractor's site or at another location within the U.S.

4. Human Use

All research involving human subjects, to include use of human biological specimens and human data, selected for funding must comply with the federal regulations for human subject protection. Further, research involving human subjects that is conducted or supported by the DoD must comply with 32 CFR 219, *Protection of Human Subjects* (<http://www.dtic.mil/biosys/downloads/32cfr219.pdf>), and DoD Directive 3216.02, *Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research* (<http://www.dtic.mil/whs/directives/corres/html2/d32162x.htm>).

Institutions awarded funding for research involving human subjects must provide documentation of a current Assurance of Compliance with Federal regulations for human subject protection, for example a Department of Health and Human Services, Office of Human Research Protection Federal Wide Assurance (<http://www.hhs.gov/ohrp>). All institutions engaged in human subject research, to include subcontractors, must also have a valid Assurance. In addition, personnel involved in human subjects research must provide documentation of completing appropriate training for the protection of human subjects.

For all proposed research that will involve human subjects in the first year or phase of the project, the institution must provide evidence of or a plan for review by an Institutional Review Board (IRB) upon final proposal submission to DARPA. The IRB conducting the review must be the IRB identified on the institution's Assurance. The protocol, separate from the proposal, must include a detailed description of the research plan, study population, risks and benefits of study participation, recruitment and consent process, data collection, and data analysis. Consult the designated IRB for guidance on writing the protocol. The informed consent document must comply with federal regulations (32

CFR 219.116). A valid Assurance along with evidence of appropriate training all investigators should all accompany the protocol for review by the IRB.

In addition to a local IRB approval, a headquarters-level human subjects regulatory review and approval is required for all research conducted or supported by the DoD. The Army, Navy, or Air Force office responsible for managing the award can provide guidance and information about their component's headquarters-level review process. Note that confirmation of a current Assurance and appropriate human subjects protection training is required before headquarters-level approval can be issued.

The amount of time required to complete the IRB review/approval process may vary depending on the complexity of the research and/or the level of risk to study participants. Ample time should be allotted to complete the approval process. The IRB approval process can last between one to three months, followed by a DoD review that could last between three to six months. No DoD/DARPA funding can be used towards human subjects research until ALL approvals are granted.

5. Animal Use

Any Recipient performing research, experimentation, or testing involving the use of animals shall comply with the rules on animal acquisition, transport, care, handling, and use in: (i) 9 CFR parts 1-4, Department of Agriculture rules that implement the Laboratory Animal Welfare Act of 1966, as amended, (7 U.S.C. 2131-2159); (ii) the guidelines described in National Institutes of Health Publication No. 86-23, "Guide for the Care and Use of Laboratory Animals"; (iii) DoD Directive 3216.01, "Use of Laboratory Animals in DoD Program."

For submissions containing animal use, proposals should briefly describe plans for Institutional Animal Care and Use Committee (IACUC) review and approval. Animal studies in the program will be expected to comply with the PHS Policy on Humane Care and Use of Laboratory Animals, available at <http://grants.nih.gov/grants/olaw/olaw.htm>.

All Recipients must receive approval by a DoD certified veterinarian, in addition to an IACUC approval. No animal studies may be conducted using DoD/DARPA funding until the USAMRMC Animal Care and Use Review Office (ACURO) or other appropriate DoD veterinary office(s) grant approval. As a part of this secondary review process, the Recipient will be required to complete and submit an ACURO Animal Use Appendix, which may be found at <https://mrmc.amedd.army.mil/AnimalAppendix.asp>

6. Publication Approval

Proposers are advised if they propose grants or cooperative agreements, DARPA may elect to award other award instruments. DARPA will make this election if it determines that the research resulting from the proposed program will present a high likelihood of disclosing performance characteristics of military systems or manufacturing technologies that are unique and critical to defense. Any award resulting from such a determination

will include a requirement for DARPA permission before publishing any information or results on the program.

The following provision will be incorporated into any resultant procurement contract or other transaction:

When submitting material for written approval for open publication as described in subparagraph (a) above, the Contractor/Awardee must submit a request for public release to the DARPA TIO and include the following information: 1) Document Information: document title, document author, short plain-language description of technology discussed in the material (approx. 30 words), number of pages (or minutes of video) and document type (briefing, report, abstract, article, or paper); 2) Event Information: event type (conference, principle investigator meeting, article or paper), event date, desired date for DARPA's approval; 3) DARPA Sponsor: DARPA Program Manager, DARPA office, and contract number; and 4) Contractor/Awardee's Information: POC name, e-mail and phone. Allow four weeks for processing; due dates under four weeks require a justification. Unusual electronic file formats may require additional processing time. Requests can be sent either via e-mail to tio@darpa.mil or via 3701 North Fairfax Drive, Arlington VA 22203-1714, telephone (571) 218-4235. Refer to www.darpa.mil/tio for information about DARPA's public release process.

7. Export Control

Should this project develop beyond fundamental research (basic and applied research ordinarily published and shared broadly within the scientific community) with military or dual-use applications the following apply:

(1) The Contractor shall comply with all U. S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120 through 130, and the Export Administration Regulations (EAR), 15 CFR Parts 730 through 799, in the performance of this contract. In the absence of available license exemptions/exceptions, the Contractor shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of (including deemed exports) hardware, technical data, and software, or for the provision of technical assistance.

(2) The Contractor shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of this contract, including instances where the work is to be performed on-site at any Government installation (whether in or outside the United States), where the foreign person will have access to export-controlled technologies, including technical data or software.

(3) The Contractor shall be responsible for all regulatory record keeping requirements associated with the use of licenses and license exemptions/exceptions.

(4) The Contractor shall be responsible for ensuring that the provisions of this clause apply to its subcontractors.

8. Subcontracting

Pursuant to Section 8(d) of the Small Business Act (15 U.S.C. 637(d)), it is the policy of the Government to enable small business and small disadvantaged business concerns to be considered fairly as subcontractors to contractors performing work or rendering services as prime contractors or subcontractors under Government contracts, and to assure that prime contractors and subcontractors carry out this policy. Each proposer who submits a contract proposal and includes subcontractors is required to submit a subcontracting plan in accordance with FAR 19.702(a) (1) and (2) should do so with their proposal. The plan format is outlined in FAR 19.704.

C. Reporting Requirements

The number and types of reports will be specified in the award document, but will include as a minimum quarterly technical and financial status reports. The reports shall be prepared and submitted in accordance with the procedures contained in the award document and mutually agreed on before award. Reports and briefing material will also be required as appropriate to document progress in accomplishing program metrics. A Final Report that summarizes the project and tasks will be required at the conclusion of the performance period for the award, notwithstanding the fact that the research may be continued under a follow-on vehicle.

1. Central Contractor Registration (CCR)

Selected proposers not already registered in the Central Contractor Registry (CCR) will be required to register in CCR prior to any award under this BAA. Information on CCR registration is available at <http://www.ccr.gov>.

2. Representations and Certifications

In accordance with FAR 4.1201, prospective proposers shall complete electronic annual representations and certifications at <http://orca.bpn.gov>.

3. Wide Area Work Flow (WAWF)

Unless using another approved electronic invoicing system, performers will be required to submit invoices for payment directly via the Internet/WAWF at <http://wawf.eb.mil>. Registration to WAWF will be required prior to any award under this BAA.

4. Patent Reporting

Awards made under this BAA will require that subject invention/patent reporting be made via iEdison, the government's Web-based invention reporting system.

VII. AGENCY CONTACTS

Administrative, technical or contractual questions should be sent via e-mail to BAA08-51@darpa.mil. All requests must include the name, email address, and phone number of a point of contact.

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