Robotics Rodeo (RR)

Technology Demonstrations

Starter Packet

NOTICE:

Please do not submit, send, present, or demonstrate, proprietary or confidential information. The information that you submit, send, present, or demonstrate must be able to be shown on your public website.

Updated: 21 MAY 09

Instructions for RR Starter Package:
Please read and fill out all included forms and send completed package to:

DAMI_RoboticsRodeo@conus.army.mil in with "RR Starter Package_ [Your Company Name]" in the subject line. If you need to add additional information related to this questionnaire, please reference the question # with your information (eg: Ref. TAI Q#2) and send via email along with the RR Starter Package. *Please do not submit, send, present, or demonstrate, proprietary or confidential information. The information that you submit, send, present, or demonstrate must be able to be shown on your public website.* For additional information about the Robotic Rodeo please visit the website at http://tardec.army.mil/roboticsrodeo.asp.

Technology Application Idea (TAI) Submission Form

Name of Technology:	
Company:	Primary Contact:
Address:	E-mail:
Suite:	Phone: Ext:
City: State: Zip:	Fax:
Country:	Website:

1) Primary Capability Addressed by Technology (Check one)

FOCUS AREA:	SCENARIO:	TERRAIN TYPE:
◯ Large Autonomous Mobility	◯ Persistence Stare	◯ Urban Environment
◯ Small Robotic Application	◯ Convoy Operations	◯ Open Rolling Terrain
◯ Sensors/ Reconnaissance, Surveillance, and Target Acquisition (RSTA)	◯ Manned/ Unmanned Team	◯ Unimproved Road Networks
	◯ Route Clearance	◯ Look out Point
◯ General Robotics	◯ Other	◯ Other

1a) Please look at the Technology Readiness Level (TRL) and the Autonomy Level Table on page 7-8 of this document.

Please check the TRL for your technology
◯ 6 ◯ 7 ◯ 8 ◯ 9
(Note: Your TRL level must be at least 6 and you must be able to provide proof)

Please check the Autonomy Level for your technology
◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ 8 ◯ 9 ◯ 10

2) Provide a brief description of the technology: (*Limit of 600 Characters*)

2a) Attach a photo and/or movie with TAI submission. ◯ Yes ◯ No (If Yes, please attach file with submission.)

3) What are the primary benefits of this technology to the Army?: (*Limit of 600 Characters*)

4) How do you propose your TAI will save lives?: (*Limit of 600 Characters*)

5) Select one answer for each question and provide written answers where requested. (Please see document "Technology Readiness Levels (TRLs) and their Definitions" on page 7 of this package for more guidance
Note: This section is MANDATORY. Please Provide detailed description.

5a) Are the basic principles of your technology observed and reported?	◯ Yes ◯ No
5b) Is your technology concept and/or application documented? If yes, please provide links or attachments.	◯ Yes ◯ No
5c) Have you proven your analytical and experimental critical functionality and/or characteristic(s)? How?	◯ Yes ◯ No
5d) Have you tested components and/or bread board in a laboratory environment? What laboratory? What was done? What were the criteria for success?	◯ Yes ◯ No

5e) Have you tested components and/or bread board in a relevant operational environment? ◯ Yes ◯ No
Where?

Who was involved?

From the military?

Name: Organization:

Phone: Email:

5f) Have you tested the system/ subsystem model or prototype in a relevant environment? ◯ Yes ◯ No
Where?

Who was involved?

From the military?

Name: Organization:

Phone: Email:

5g) Have you tested the system prototype in a relevant environment? ◯ Yes ◯ No
Where?

Who was involved?

From the military?

Name: Organization:

Phone: Email:

5h) Has your actual system been completed and qualified through test and demonstration? ◯ Yes ◯ No
Where?

Who was involved?

From the military?

Name: Organization:

Phone: Email:

5i) Has the actual system been proven through a successful relevant operation? ◯ Yes ◯ No
Where?:

Who was involved?

From the military?

Name: Organization:

Phone: Email:

6.) Please describe the most current level of autonomy that has been demonstrated. Refer to the Level of Autonomy definitions on page 8. (*Limit of 600 Characters*)

7) Is your technology being used on any current military system(s)? ◯ Yes ◯ No
If yes, what platform(s) is your technology on?: (*Limit of 600 Characters*)

8) Is your technology currently being applied in the private or academic sector? ◯ Yes ◯ No
If so, how is it being applied?: (*Limit of 600 Characters*)

9) What developmental issues with your technology do you see integrating it into a military environment (bandwidth spectrums, command and control, level of autonomy, transportability, etc)? (*Limit of 600 Characters*)

10) Have you ever shown/discussed/been in contact with the government regarding your TAI? ◯ Yes ◯ No
If so, what are the names and the emails of the personnel you have been in contact with?

Name:	Email:
Name:	Email:
Name:	Email:
Name:	Email:
Name:	Email:

11) Are you willing to share information with the government? ◯ Yes ◯ No
If yes, please list any requirements: (*Limit of 600 Characters*)

12) What are weight and dimension characteristics of your technology?: (*Limit of 600 Characters*)
13) Are you using a communication protocol for you demonstration? ◯ Yes ◯ No If yes, what is it and what is your transmitter and receiver strength (in watts)
14) Does the technology have safety procedures? ◯ Yes ◯ No If yes, please describe

Appendix A: Technology Readiness Levels (TRLs) and their Definitions

The following matrix lists the various technology readiness levels and descriptions from a systems approach for both Hardware and Software. DoD Components may provide additional clarifications for Software. Supplemental definitions follow the table.

Technology Readiness Level (TRL)	Description
1. Basic principles observed and reported.	Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include paper studies of a technology's basic properties.
2. Technology concept and/or application formulated.	Invention begins. Once basic principles are observed, practical applications can be invented. Applications are speculative and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic (paper) studies.
3. Analytical and experimental critical function and/or characteristic proof of concept.	Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.
4. Component and/or breadboard validation in laboratory environment.	Basic technological components are integrated to establish that they will work together. This is relatively "low fidelity" compared to the eventual system. Examples include integration of "ad hoc" hardware in the laboratory.
5. Component and/or breadboard validation in relevant environment.	Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.
6. System/subsystem model or prototype demonstration in a relevant environment.	Representative model or prototype system, which is well beyond that of TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high-fidelity laboratory environment or in simulated operational environment.
7. System prototype demonstration in an operational environment.	Prototype near, or at, planned operational system. Represents a major step up from TRL 6, requiring demonstration of an actual system prototype in an operational environment such as an aircraft, vehicle, or space. Examples include testing the prototype in structured or actual field use.
8. Actual system completed and qualified through test and demonstration.	Technology has been proven to work in its final form and under expected operational conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation of the system in its intended or pre-production configuration to determine if it meets design specifications and operational suitability.
9. Actual system proven through successful mission operations.	Actual application of the technology in its production configuration and under mission conditions, such as those encountered in operational test and evaluation. Examples include using the system by operational users under operational mission conditions.

Supplemental definitions

BREADBOARD: Integrated components that provide a representation of a system/subsystem and which can be used to determine concept feasibility and to develop technical data. Typically configured for laboratory use to demonstrate the technical principles of immediate interest. May resemble final system/subsystem in function only.

"HIGH FIDELITY": Addresses form, fit and function. High-fidelity laboratory environment would involve testing with equipment that can simulate and validate all system specifications within a laboratory setting.

"LOW FIDELITY": A representative of the component or system that has limited ability to provide anything but first order information about the end product. Low-fidelity assessments are used to provide trend analysis.

MODEL: A functional form of a system, generally reduced in scale, near or at operational specification. Models will be sufficiently hardened to allow demonstration of the technical and operational capabilities required of the final system.

OPERATIONAL ENVIRONMENT: Environment that addresses all of the operational requirements and specifications required of the final system to include platform/packaging.

PROTOTYPE: A physical or virtual model used to evaluate the technical or manufacturing feasibility or military utility of a particular technology or process, concept, end item or system.

RELEVANT ENVIRONMENT: Testing environment that simulates the key aspects of the operational environment.

SIMULATED OPERATIONAL ENVIRONMENTAL: Either 1) a real environment that can simulate all of the operational requirements and specifications required of the final system, or 2) a simulated environment that allows for testing of a virtual prototype; used in either case to determine whether a developmental system meets the operational requirements and specifications of the final system.

Appendix B: Autonomy Levels and their Definitions

The following matrix lists the various autonomy level and descriptions from a systems approach for both Hardware and Software..

1	Remote control in relatively simple stationary environments.
2	Remote control in relatively complex stationary environments.
3	Basic path following with operator help on a pre-planned mission.
4	Leader follower with operator help in a simple environment.
5	Basic cross country navigation with simple obstacle detection and avoidance.
6	Cross country with complex obstacle avoidance and negotiation with some operator help.
7	Cross country with complex and moving obstacle avoidance with little operator help.
8	Rapid execution of on-road driving tasks such as traffic signals, intersections, and on-coming traffic with minimal operator help.
9	Complex collaborative missions with some operator oversight.
10	Full autonomy with human levels of performance or better.