



## Project Concept Proposal Guide Lines

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## 1.0 Overview

### 1.1 Background

CANEUS International is a non-profit organization serving the needs of the aeronautics, space and defense communities by fostering the coordinated, international development of high-risk, high-cost Micro and Nano Technology (MNT) solutions for aerospace applications. As a "hands on" organization, CANEUS is focused on the practical aspects of transitioning MNT rapidly and efficiently from the concept to the aerospace system level. In achieving this goal, CANEUS brings together technology developers, aerospace end-users, governmental policy makers and investors from across the world. CANEUS leads and coordinates the efforts of entities in Canada, the United States, Europe and other countries, such as Japan and Brazil, in the rapid and cost effective acceleration of MNT from the laboratory to market deployed aerospace products and system level solutions.

CANEUS MNT projects and initiatives are defined and carried out by the businesses and institutions within the Aerospace Community and the process that is used to select which projects or initiatives to pursue begins with a the submission of a **Project Concept**. Anyone in the Aerospace Community can propose a **Project Concept** but once a project is selected for effectuation by the CANEUS members then the proposer must be a member to continue with the program.

Typically, only high-risk, high-cost projects that are beyond the means of any single business or institution are selected for addition to the portfolio of CANEUS projects and only projects that have wide appeal to a broad base of CANEUS members are considered. These types of projects provide the best opportunity to leverage the resources of the CANEUS membership.

It is possible for a proposer of a **Project Concept** to describe a:

- process development or;
- product development or;
- initiative (such as developing standards or creating a web portal for example) or;
- broad program of initiatives and developments (to initiate a sector consortium).

Any of these forms of projects is an acceptable category for a CANEUS Project.

### 1.2 Process

- For *non-member* Project Concepts:
  - Unsolicited concept proposal will be accepted at any time as long as the following guide lines are followed to submit the MNT concept.
  - Concept Proposals can be submitted on line or sent to the Executive Director of CANEUS
  - The Concept Proposal in turn will be circulated among the experts from the CANEUS membership or aerospace community to gauge interest in the concept. If the proposer selects any of the classifications outlined in “4.0 Project Classification” the proposal will be forwarded directly to the managing Work Program Board (WPB) Chairman or Sector Consortium Director. (See appendix A for a description of CANEUS’ Work Program Boards and Sector Consortia)

- If any of the WPB Chairman or Sector Consortia Directors finds merit in the Project Concept, the proposer of the concept will be contacted by the CANEUS Executive Director and invited to become a member of CANEUS.
  - Once the proposer is a member of CANEUS, a project team will be organized and a detailed Project Proposal will be developed with the assistance from CANEUS staff and the project team.
- For *member* Project Concepts:
    - A member’s **Concept Proposal** is most likely responsive to a Work Program Board’s program or an established Sector Consortia’s program (see appendix A) in which case the Concept Proposal will be sent directly to the WPB Chairman or Sector Consortium Director
    - If the scope of work of the member’s Concept Proposal does not fit the member’s existing CANEUS Project activities, the proposal will be sent to the Executive Director of CANEUS
    - The Concept Proposal in turn will be circulated among the experts from the CANEUS membership or aerospace community to gauge interest in the concept. If the proposer selects any of the classifications outlined in “4.0 Project Classification” the proposal will be forwarded directly to the managing Work Program Board Chairman or Sector Consortium Director.
    - If any Sector Consortia Director accepts the **Project Concept** or any WPB Chairman wants to start a new Project, the member will be contacted by that Chairman and invited to become a team member of that group.
    - Once the Project Concept has been accepted, a project team will be organized and a detailed **Project Proposal** will be developed with the assistance from CANEUS and the project team.

The requirements for a CANEUS **Project Proposal** are much more extensive and involved a greater number of resources and therefore it is highly recommended that a potential proposer to CANEUS use the **Project Concept** process first to gauge interest and support from among the Aerospace Community before expending an extensive effort to develop a detailed proposal.

## 2.0 Content of Proposal Main Body (up to 8 pages)

The intent of the Project Concept proposal is to provide a **quick overview** of a particular opportunity to deploy micro and nano technology into the Aerospace community. To that end, the total page length for this proposal should be kept to between 5 to 10 pages (size 8.5”x 11”) using 10 point or larger type, margins of at least ¾ inch. If the reviewers of the proposal require further information, the proposer will be contact so make every effort to be brief. The reviewers of the CANEUS Project Concept proposals are much more apt to focus on concise short summaries than long wordy documents.

### 2.1 Cover Page

The cover page should contain the following information along with a **General Description** of the project. The general description is equivalent to an executive summary and it is recommended that this section be created last after all critical aspects of the proposal have been determined so that they may be reflected in the narrative of this



section. This section will be for use in public documents and written for understanding of a non-technical person. Use the top ¼ of the page for the following information (use large point type greater than 14 point) and use the remaining ¾ of the cover page for the General Description. Call CANEUS at +1 514-499-3959 and ask the Executive Director to assign a CANEUS ID # for the concept proposal document.

[Title of Project Concept]  
CANEUS ID #: [To be assigned by CANEUS]  
[Date submitted]

[Name of proposer]  
[Organization]  
[Address]

[Name of Senior Staff of Organization with Signing Authority]

[Telephone number]

[E-mail address]

## 2.2 Technical and Programmatic Background

This section should be no more than 4 pages and should indicate the characterization of the project as:

- **process development** or;
- **product development** or;
- **initiative** (such as developing standards or creating a web portal for example) or;
- **sector consortium** (a broad program of initiatives and/or developments).

A bolded sentence with this characterization should be included in the Technical and Programmatic Background section. The narrative in this section should include a problem statement and a proposed solution.

If the project concept is characterized as either a **product or process development**, then describe the innovative technology, state of the art, current maturity level of the technology, and projected maturity level at the conclusion of the project based upon technology readiness levels (see Appendix C for technology readiness level designations). And since the CANEUS membership is focused on total and commercially viable solutions, the proposer should describe the complementary portfolio of technologies needed for a complete system product or process. Also, include a listing of leading organizations in the business space, key technology developers, potentially interested parties (very important to list), and any challenges or outstanding issues (such as government regulations) involved.

If the project concept is characterized as an **initiative**, then, in addition to the problem statement and proposed solution, include a description of past and current efforts providing a foundation for the project, and a listing of:

- leading organizations in the business space,
- potentially interested parties (very important to list), and

- any challenges or outstanding issues (such as government regulations) involved.

If the project concept is characterized as a **sector consortium**, in addition to the problem statement and proposed solution, delineate the initiatives and developments that comprise the program along with a brief description of each and a listing of:

- leading organizations that potential benefit (very important to list),
- any international organizational, cooperation and coordination required and,
- any challenges or outstanding issues (such as government regulations) involved.

### 2.3 Project Characterization

In the CANEUS innovation model, the ideal project is a collaboration of members that provides a solution for a number of aerospace **applications**, involving a portfolio of **technology** development provided by a supply chain made up of **stake holders** with the resources to create and support the resulting MNT product or process in the market place. In other words, the greater number of MNT technologies needed, stake holders involved, and applications impacted the better the CANEUS member resource utilization is. Therefore, in your proposal, indicate the full extent of technologies involved in your project (use the specific terms in the following list);

#### **Technology** (MNT impacted)

- Materials
- Electronics
- Controls
- Sensors
- Power
- Optics
- Fluid
- Processes
- Quality Systems

indicate the full extent of the supply chain participants (stake holders) necessary to ensure the success of your project (use the specific terms in the following list);

#### **Stake Holders** (MNT capable)

- End Users
- Systems Integrators
- Component Suppliers
- Agencies
- Academia
- Process Suppliers

indicate all of the aerospace applications impacted by your project (use the specific terms in the following list).

#### **Applications** (MNT embedded appl.)

- Aircraft
  - Fixed Wing
    - Air Frame
    - Flight controls
    - Avionics
    - Propulsion
    - Accessories
  - Rotary Wing

- Air Frame
- Fight controls
- Avionics
- Propulsion
- Accessories
- Space
  - Payload
    - Satellites
    - Manned Vehicles
    - Cargo
  - Launch Vehicle
  - Ground Support

## 2.4 Implementation Plan

In the project implementation plan include:

- **Potential Team Members:** If you do not have all the members selected and need input from CANEUS Members, indicate so:
- **Tasks, Deliverables and Timeline:** Submit a high level (use 2 levels at most) work breakdown structure using a Gantt chart type format and indicate significant milestones and deliverables;
- **Estimated Budget:** Include a high level, rough budget estimate broken into administration dollars, development dollars and equipment. Distribute the funds over the proposed life of the program and indicate as best as possible the distribution of costs among the team members. If you don't have all your team members selected, leave the budget estimate consolidated into 3 lines.
- **Potential Funding Sources:** If you have knowledge of federal, state/provincial, or commercial entities that are interested and capable of providing funds or have existing funding vehicle in place, please list the sources.
- **Support of Project Leader's Organization:** Provide a statement as to what extent your organization is willing to go to support this project in terms of personnel, line item budget support, in-kind resources, and strategic visibility.

## 3.0 Commercialization/Deployment (up to 4 pages)

The focus of CANEUS is not only to create but to **deploy** MNT into the Aerospace Community. Prepare a section of up to 4 pages describing your project's commercialization/deployment plan. This section should consist of high level statements relative to market potentials, deployment /distribution channels, benefactors, and needed resources. To this end, the proposal should provide a high level set of statements for product/process development or initiative deployment and should be appropriate for the development stage of the innovation. Key items that should be provided are:

- **Estimated Market Size.**
- **Similar or substitute technologies** (applies to product/process developments).
- **Brief profile of customers** that can utilize the new technology.
- **Strategy for marketing** the new product or process as defined by the System Integrator/Market Lead (if such a team member exists at the time of project submission) or for deploying the benefits of the proposed initiative
- **Brief explanation of additional investments**, staffing, facility expansion, manufacturing, or distribution capabilities required to support the product/process or initiative in the market.



- **Evaluation of strategic alliances** or joint ventures needed for future commercialization opportunities.

#### **4.0 Project Classification** (one sentence)

In order to help CANEUS direct your proposal to the appropriate expert, review Appendix A and prepare a statement that indicates the Sector Consortia or Work Program Board that is best suited to review your proposal. If you are not able to determine the best group within CANEUS to render an opinion relative to your proposal, contact the Executive Director of CANEUS for assistance.

#### **5.0 Support of CANEUS** (1/2 page)

Review Appendix B then prepare a statement that describes how your project complies with the **mission** of CANEUS. Also, prepare a statement that describes how your project complies with the **vision** of CANEUS. And finally, prepare a statement that identifies the CANEUS **goals** your project is consistent with and explain why.

#### **6.0 Concept Proposal Submission**

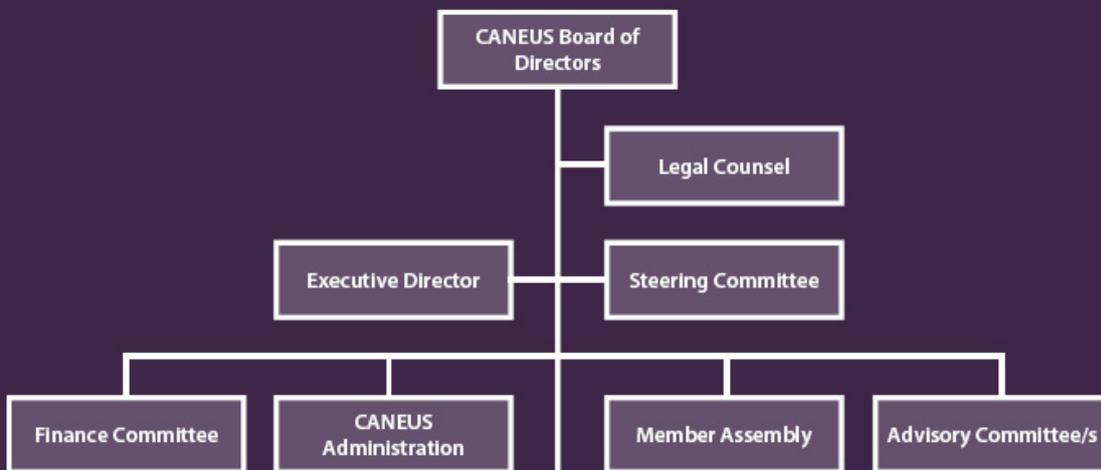
Add a signature line to your concept proposal for the preparers contact information and signature and add a line for your organization's senior staff representative with signing authority. Affix both signatures to your proposal, take an image of the document and submit the package electronically to [concept@caneus.org](mailto:concept@caneus.org). CANEUS will acknowledge receipt of the e-mail and provide information on the disposition of the Project Concept within a week of receiving the proposal. However it may take a number of weeks to process the proposal before a final response is provided to you. If you have any questions call the CANEUS Executive Director at +1 514-499-3959

**Appendix A: CANEUS Project Structure - Work Program Boards and Sector Consortia**

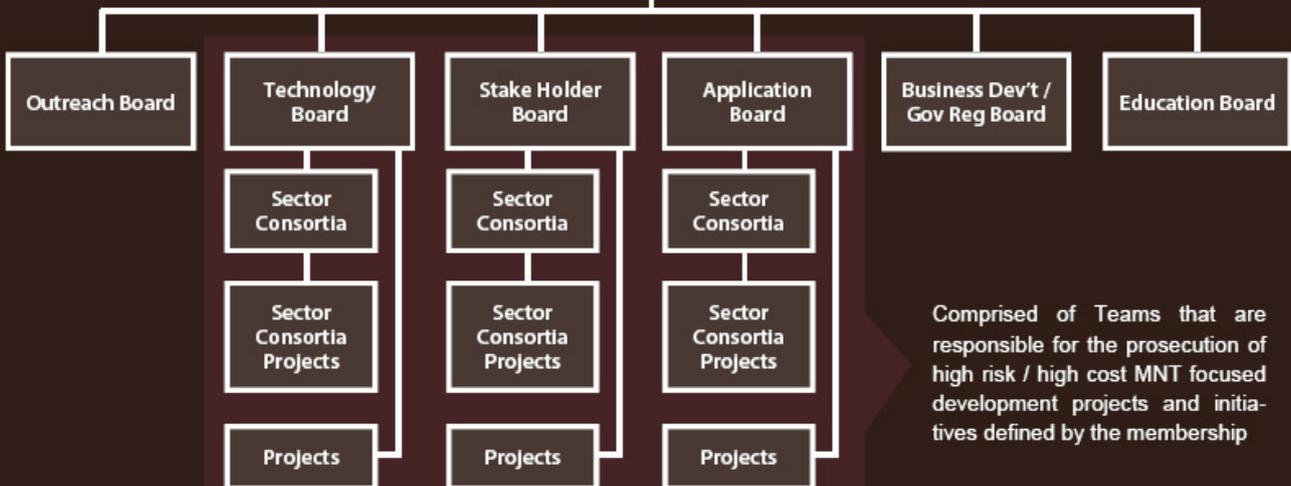
**CANEUS STRUCTURE**

The CANEUS Organization is specifically structured to support a technology based membership organization. The structure is comprised of an administration level and a work program level. The **administration level** is populated by CANEUS members with just a few positions filled by support staff. In the **work program level**, a number of functional boards comprised of CANEUS members involved in program management and business development are responsible for sector consortia

**ADMINISTRATION LEVEL**



**WORK PROGRAM LEVEL**



## Work Program Boards

- a. The **Outreach Board**, comprised of a Chairman, and Project Leaders, directs membership recruitment and relationship, interfaces with Sector Consortia and projects teams, and manages: interaction with other conferences, relationships with other industry associations, relationships with industry standards organizations, and matters pertaining to the organization's marketing, promotion, and web site content.
- b. The **Technology Board**, comprised of a Chairman, Sector Consortia Directors, and Project Leaders, is responsible for defining and managing all **cross cutting technology based projects**, establishing technology based Sector Consortia, assembling CANEUS Strategic and Annual Work Plan input for the Steering Committee, and collaborating with the Application and Stakeholder Boards on defining Project Plans.

Micro and nano technology impacted technology areas that may give rise to projects include but are not limited to: **materials, electronics, controls, sensors, power, optics, fluids, processes, and quality systems.**

- c. The **Stakeholder Board**, comprised of a Chairman, Sector Consortia Directors, and Project Leaders, assembles a **supply chain from CANEUS membership** and is responsible for defining and managing of all stakeholder based projects, establishing stakeholder based Sector Consortia, assembling CANEUS Strategic and Annual Work Plan input for the Steering Committee, and collaborating with the Technology and Application Boards on defining Project Plans.

Stakeholders include but are not limited to: **end users, systems integrators, component suppliers, process suppliers, agencies, and academia.**

- d. The **Application Board**, comprised of a Chairman, Sector Consortia Directors, and Project Leaders, is responsible for defining and managing all **cross cutting application based projects**, establishing application based Sector Consortia, assembling CANEUS Strategic and Annual Work Plan input for the Steering Committee, and collaborating with Technology and Stakeholder Boards on defining Project Plans.

Micro and nano technology embedded application areas that may give rise to projects include but are not limited to: **aircraft, air frame, fight controls, avionics, propulsion, accessories, space, satellites, manned vehicles, and cargo.**

- e. The **Business Development / Government Regulation Board**, comprised of a Chairman and Project Leaders, is responsible for supporting development of Project **business cases**, providing Member business evaluation services, providing IP valuation and brokering services, developing the organization's Investment Fund, managing new business start-up processes, managing syndicated investment funding for projects, establishing innovation policies and procedures, and infusing innovation practices into project development.

- f. The **Education Board** comprised of a Chairman and Project Leaders, is responsible for establishing an **academic global network** of micro and nano technology capabilities related to the aerospace market, a curriculum of micro and nano technology courses that support aerospace applications, a global web portal of academic capabilities for aerospace applications and related technologies, and a global student web portal for aerospace related opportunities. It is also responsible for developing a harmonized technology transfer policy for spin-off intellectual property.

### **Sector Consortia**

A Sector Consortium consists of an international public/private partnership between industry, university, and government stakeholders where the membership's resources are pooled to focus on high-risk, high-cost initiatives. If the aerospace community identifies a MNT related need that is broad based and involves a portfolio of projects and initiatives, then a sector consortium is established.

Based on input from past conferences and the recommendations of CANEUS constituents, a number of Sector Consortia have been created and are currently in various stages of implementation. Following are descriptions of the current slate of Sector Consortia.

#### **Small Satellites**

The CANEUS Small Satellite Sector Consortium (SSSC) is an international consortium dedicated to the micro and nano technology implementation, coordination, and standardization of the small (1-100 kg) satellite industry. The SSSC oversees five projects and initiatives dedicated to (1) developing standards so as to ensure international interoperability, (2) identifying launch opportunities and services, (3) providing stakeholder liaison and strategic development, (4) addressing Intellectual Property and ITAR issues in accordance with CANEUS International's broader mission, and (5) organizing launch certification services.

#### **Fly-by-Wireless**

The CANEUS Fly-by-Wireless Sector Consortium is chartered to precipitate cooperation and partnerships between industry/government customers, system innovators, and technology developers, while exchanging public and published information on wireless alternatives and new innovations, such as no-power sensor-tag systems. Ultimately, the Consortium's efforts will contribute to minimizing cables and connectors across the aerospace industry by providing reliable, lower cost, and higher performance alternatives for a vehicle's or program's life cycle. Sub-discipline initiatives include Structural Vehicle Health Monitoring.

#### **Aerospace Reliability**

The CANEUS International Reliability Sector Consortium is the steward of the aerospace industry's strategic and technology roadmap for reliability technologies. It provides an international forum for the advancement of reliability issues and technical solutions, and manages an industry portal for members' technologies. The Consortium is the premier advocacy group addressing regulations and the development of standards and certification requirements for RF and other MEMS devices. Membership in the Consortium includes all primary industry stakeholders.



### **Devices**

The CANEUS Devices Sector Consortium coordinates the activities of several sub-disciplines including Harsh Environment Sensors, Optoelectronics, Bio-Astra, and Environmental Monitoring. <http://devices.caneus.org>

### **Materials**

The Materials Sector Consortium coordinates the:

- A. Development of composite materials for load bearing, structural applications, thermal protection and radiation shielding systems.
- B. Development of multifunctional composite materials with MNT embedded sensors.

## Appendix B: CANEUS Mission, Vision, and Goals

### 1. Mission

To establish global public/private partnerships within the aerospace community by fostering a collaborative environment aimed at the adoption, adaptation, and accelerated commercialization of micro and nano technologies (MNT).

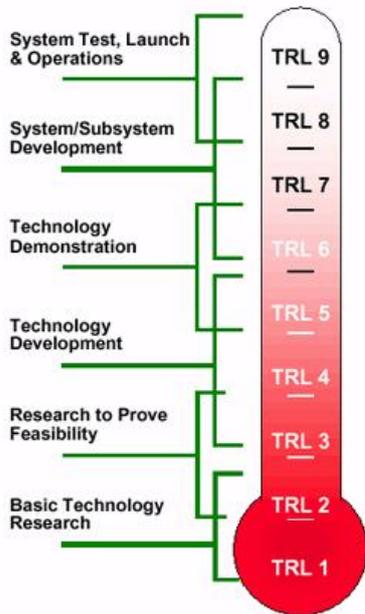
### 2. Vision

Through the creation of international consortia that accelerate the development and use of MNT in the aerospace industry, CANEUS will become the “Virtual World Aerospace Organization” and be recognized for its excellence in providing high return on investment for its stakeholders.

### 3. Goals

1. To syndicate resources from all stakeholders and reduce the high costs and high risks associated with disruptive technologies.
2. To develop a portfolio of projects focused on meeting the current and emerging needs of stakeholders, providing an economically viable solution in so doing.
3. To create an innovation environment for stakeholders to develop MNT based solutions focused on an integrated supply chain.
4. To create a value chain that will result in rapid and efficient commercialization of new products and solutions.
5. To provide an international platform that will be conducive to advancing knowledge, innovation, training, and competitiveness.
6. To become an intelligent third-party broker of MNT for the aerospace community and a conduit for the exploitation of MNT through linkages.
7. To become a clearing-house and technology-watch for MNT worldwide.

### Appendix C: Technology Readiness Levels



A Technology Readiness Level (TRL) is a measure used by some United States government agencies and many major world's companies (and agencies) to assess the maturity of evolving technologies (materials, components, devices, etc.) prior to incorporating that technology into a system or subsystem. Generally speaking, when a new technology is first invented or conceptualized, it is not suitable for immediate application. Instead, new technologies are usually subjected to experimentation, refinement, and increasingly realistic testing. Once the technology is sufficiently proven, it can be incorporated into a system/subsystem.

**Technology Readiness Levels in the National Aeronautics and Space Administration(NASA)**  
 (Source: Mankins (1995), *Technology Readiness Levels: A White Paper*)

Technology Readiness Level	Description
1. Basic principles observed and reported	This is the lowest "level" of technology maturation. At this level, scientific research begins to be translated into applied research and development.
2. Technology concept and/or application formulated	Once basic physical principles are observed, then at the next level of maturation, practical applications of those characteristics can be 'invented' or identified. At this level, the application is still speculative: there is not experimental proof or detailed analysis to support the conjecture.
3. Analytical and experimental critical function and/or characteristic proof of concept	At this step in the maturation process, active research and development (R&D) is initiated. This must include both analytical studies to set the technology into an appropriate context and laboratory-based studies to physically validate that the analytical predictions are correct. These studies and experiments should constitute "proof-of-concept" validation of the applications/concepts formulated at TRL 2.

<p>4. Component and/or breadboard validation in laboratory environment</p>	<p>Following successful "proof-of-concept" work, basic technological elements must be integrated to establish that the "pieces" will work together to achieve concept-enabling levels of performance for a component and/or breadboard. This validation must be devised to support the concept that was formulated earlier, and should also be consistent with the requirements of potential system applications. The validation is relatively "low-fidelity" compared to the eventual system: it could be composed of ad hoc discrete components in a laboratory.</p>
<p>5. Component and/or breadboard validation in relevant environment</p>	<p>At this level, the fidelity of the component and/or breadboard being tested has to increase significantly. The basic technological elements must be integrated with reasonably realistic supporting elements so that the total applications (component-level, sub-system level, or system-level) can be tested in a 'simulated' or somewhat realistic environment.</p>
<p>6. System/subsystem model or prototype demonstration in a relevant environment (ground or space)</p>	<p>A major step in the level of fidelity of the technology demonstration follows the completion of TRL 5. At TRL 6, a representative model or prototype system or system - which would go well beyond ad hoc, 'patch-cord' or discrete component level breadboarding - would be tested in a relevant environment. At this level, if the only 'relevant environment' is the environment of space, then the model/prototype must be demonstrated in space.</p>
<p>7. System prototype demonstration in a space environment</p>	<p>TRL 7 is a significant step beyond TRL 6, requiring an actual system prototype demonstration in a space environment. The prototype should be near or at the scale of the planned operational system and the demonstration must take place in space.</p>
<p>8. Actual system completed and 'flight qualified' through test and demonstration (ground or space)</p>	<p>In almost all cases, this level is the end of true 'system development' for most technology elements. This might include integration of new technology into an existing system.</p>
<p>9. Actual system 'flight proven' through successful mission operations</p>	<p>In almost all cases, the end of last 'bug fixing' aspects of true 'system development'. This might include integration of new technology into an existing system. This TRL does <i>not</i> include planned product improvement of ongoing or reusable systems.</p>

**Appendix D: Contact information for project leader and project team members**

1. Project Participant 1  
Position  
Organization  
Location  
Tel: (xxx) xxx-xxxx  
Fax: (xxx) xxx-xxxx  
E-mail: [abc@abc.org](mailto:abc@abc.org)
  
2. Project Participant 2  
Position  
Organization  
Location  
Tel: (xxx) xxx-xxxx  
Fax: (xxx) xxx-xxxx  
E-mail: [abc@abc.org](mailto:abc@abc.org)
  
3. Project Participant 3  
Position  
Organization  
Location  
Tel: (xxx) xxx-xxxx  
Fax: (xxx) xxx-xxxx  
E-mail: [abc@abc.org](mailto:abc@abc.org)
  
4. Project Participant 4  
Position  
Organization  
Location  
Tel: (xxx) xxx-xxxx  
Fax: (xxx) xxx-xxxx  
E-mail: [abc@abc.org](mailto:abc@abc.org)
  
5. Project Participant 5  
Position  
Organization  
Location  
Tel: (xxx) xxx-xxxx  
Fax: (xxx) xxx-xxxx  
E-mail: [abc@abc.org](mailto:abc@abc.org)