

CHAPTER 2

GUIDELINES FOR PREPARING A TIP PROJECT NARRATIVE

A. INTRODUCTION DECISION-MAKING TIPS

The Technology Innovation Program (TIP) supports high-risk, high-reward research that addresses societal challenges in areas of critical national need. TIP's legislation requires that all evaluation and award criteria must be met in order for TIP to award funding for a research project.

Only projects that are within the TIP mission, eligibility requirements, and the technical scope of the competition described in the Federal Funding Opportunity (FFO) notice will be considered for funding. Ineligible projects and ineligible applicants will not be considered for funding. Therefore, it is essential that the proposer thoroughly review the eligibility requirements found in Chapter 1, the project narrative requirements of this chapter, and the FFO for technical scope requirements, plus any documents referenced therein. If a potential applicant is unsure whether their proposed research or technological advancement falls within the scope of the TIP program and the competition technical scope, they should contact TIP for clarification using the points of contact identified within the FFO or those listed on p. 2 and 3 of this Kit. TIP funds only high-risk, high-reward research, and does not fund other types of projects including unbounded basic (discovery) research, product development, and commercialization efforts (see Chapter 1 p. 7 for other funding exclusions).

In preparing a TIP Project Narrative, the applicant needs to think about the best way to explain how the proposed research project will address the TIP defined societal challenge(s) as presented in the FFO. If successful, the proposed transformational technology should achieve a game-changing advance in the state of the art and in how the particular societal challenge is overcome. The proposer should seek to quantify the technological advance to be achieved over current capabilities and explain the transformational impact the proposed project's outcome would have on the societal challenge. In other words, if successful, how will the technology resulting from the TIP-funded R&D more efficiently, effectively, and competitively address the societal challenge than today's competing solutions? What will be the pathway, resource requirements, and teaming necessary for successful implementation of the research tasks and subsequent outcome? Without a credible and clear strategy, plan, and timeline for achieving the research, and potential impacts to address the societal challenge, a proposal may be considered less competitive when evaluated against the criteria discussed below.

To be competitive, TIP Project Narratives must include four key elements: impact planning (to address the national impacts you expect to achieve as a result of the proposed research), technical

planning (the project's technical plan to reach research goals), why propose to TIP (the appropriateness of TIP as a funder), and lastly, the project budget. Consideration of all four elements is necessary at all stages of a proposal's development, detailed preparation, and final submission since changes within one element can often affect other elements. The first three elements are discussed in detail here in Chapter 2. Additional guidance for developing a project budget is found in Chapter 3 and Chapter 7.

Once a metrics-based understanding of the proposed impact and technical goals you wish to accomplish are established, and the corresponding novelty of the proposed research results or outcomes and the novelty of the research approach itself are understood, proposers should be sure the envisioned project is appropriate to propose to TIP. Does it fit within the TIP mission and eligibility requirements? Does it fall within the technical scope of the competition as described in the FFO? Also, what resources are needed to fully accomplish the envisioned technical and impact goals? Resources include the team members and the project budget.

Team members include project participants and any informal collaborators needed to accomplish the research activities during the project or impact goals outside the project. Project participants are organizations involved in the R&D and are represented within the project budget. A project participant may be the recipient, a joint venture member, a contractor, or a subrecipient. Informal collaborators are those organizations or individuals that are not a part of the project's budget but have a distinct role in helping the team accomplish their technical or impact objectives.

Teaming is often critically important to successful proposals as multidisciplinary approaches are often required to advance the state of the art, or for the results of the research to be adopted by others, and to overcome the societal challenge being targeted. Like teaming, the project budget represents not only the financial resources that will be needed, but also how those resources will be allocated across cost categories, major R&D tasks, and the project participant(s) performing the major R&D tasks.

Preparing a budget that is directly linked to the technical plan and that includes cost-sharing requirements can be a very complex task. Often proposers go through multiple iterations of budget estimates, task assignments, and the like, before a well integrated plan is developed.

Indeed, it is often the case that details of the technical plan describing the work and tasks each team member will perform and the associated costs of each task are best created once an effective team and budget are developed. Therefore early planning considerations should be resolved before moving forward to create the final project narrative.

As you begin crafting your TIP Project Narrative, avoid the proposal weaknesses shown in Table 2.1 that are commonly seen in non-competitive TIP proposals.

Table 2.1: Proposal Weaknesses to Avoid

<p>Outside of the TIP mission</p> <ul style="list-style-type: none"> • Low technical-risk (e.g., product development) or unbounded (discovery) research. • Lacks demonstrated need for TIP support. • Reasonable and thorough efforts to obtain other funding have not been adequately pursued and documented.
<p>Outside of the Solicitation Scope</p> <ul style="list-style-type: none"> • Lacks clear alignment to the competition as defined in the FFO notice. • Fails to clearly and explicitly meet scope requirements.
<p>Insufficient Detail and/or Unsupported Assertion Regarding Key Requirements</p> <ul style="list-style-type: none"> • Absence of convincing case for the novelty of outcome, based on a clear analysis of the competitive landscape of relevant technologies. • Lack of adequate presentation of how the R&D is high-risk, high-reward and/or how research outcomes could be transformational. • Insufficient description of how the technical and impact objectives will be accomplished, and by whom. • Inadequate or incomplete descriptions of the R&D plan, and/or lack of associated metrics, milestones, and relevant alternate pathways; unclear relevancy of technical staff to the technical plan. • Incomplete multi-year budget and/or lack of appropriate linkage of the budget to the technical plan. • Incomplete or insufficient impact strategies; impact strategies founded solely on a “build-it-and-they-will-come” approach. • Insufficient level of detail regarding analysis of markets, competition, resource requirements, or team capabilities. • Lack of appropriate detail on partnering strategies, competitive analysis, and depth and strength of the team’s capabilities to address the area of critical national need described in the FFO.
<p>Content Issues</p> <ul style="list-style-type: none"> • Failure to adequately address all TIP Award and Evaluation criteria. • Joint venture members who do not meet eligibility and substantial involvement requirements, if appropriate. • Failure to submit all required forms, letters, and additional documentation. • Failure to generate and provide a complete budget and supporting budget narrative.

The following is a detailed discussion of the key information that needs to be a part of a TIP Project Narrative and that forms the foundation for evaluating proposals against the TIP Award and Evaluation criteria. Although the specific format below is not required, to be competitive a proposal must address all components of the evaluation and award criteria. TIP reviewers are familiar with the technology discussed in the proposal; however, reviewers are limited to using only what is provided in the proposal to evaluate the project against the TIP Award and Evaluation Criteria.

B. DEFINITIONS

In preparing a proposal it is important to keep a few key definitions in mind. (A complete list of definitions can be found in 15 C.F.R. § 296.2.)

1. Critical National Need means an area that justifies government attention because the magnitude of the problem is large and the societal challenge(s) that need to be overcome are not being addressed, but could be addressed through high-risk, high-reward research. (Note that each competition will focus on specific societal challenge(s) within one or more areas of critical national need as identified in the FFO notice announcing the competition.)
2. High-Risk, High-Reward Research means research that: (1) has the potential for yielding transformational results with far-ranging or wide-ranging implications; (2) addresses areas of critical national need that support, promote, and accelerate innovation in the United States and are within NIST’s areas of technical competence; and (3) is too novel or spans too diverse a range of disciplines to fare well in the traditional peer-review process.
3. Societal Challenge means a problem or issue confronted by society that when not addressed could negatively affect the overall function and quality of life of the Nation, and as such justifies government attention.
4. Transformational Results means potential project outcomes that enable disruptive changes over and above current methods and strategies. Transformational results have the potential to radically improve our understanding of systems and technologies, challenging the status quo of research approaches and applications.

C. EXECUTIVE SUMMARY

The proposal should begin with a brief, two-page Executive Summary that presents the major ideas in the proposal. TIP recommends that the summary be completed after the other sections have been written. The summary should be well thought out and should carefully map the salient points of the proposal to all TIP Award and Evaluation criteria. Do not create a summary by simply cutting and pasting sections from the body of your proposal. Use the summary to present a high-level storyline of the proposal against the criteria and to introduce the participants.

D. PROJECT NARRATIVE

To facilitate proposal writing and the TIP evaluation process, TIP recommends that the Project Narrative address each of the three major sections presented below. These sections include (D.1) Why Propose to TIP, (D.2) Impact Planning, and (D.3) Technical Planning, and tie them to the relevant TIP Award Criteria (15 C.F.R. § 296.22), and TIP Evaluation Criteria (15 C.F.R. § 296.21).

- Chapter 2 Sections D.1 and D.2(1) offer guidance on how proposers should address the portions of the award criteria used

during the Preliminary Review phase of proposal evaluation to determine whether the proposal is eligible for further consideration by the Evaluation Panel. Proposals that warrant further consideration will be reviewed further against the evaluation criteria, described in sections D.2 and D.3, and all award criteria, described throughout the remainder of the Chapter.

- Chapter 2 Section D.2 offers guidance on how proposers should address the evaluation criterion requiring that they adequately establish that the project will advance the state of the art and contribute significantly to the U.S. science and technology base, and describe how the results of the project have a strong potential to address the societal challenge(s), and will enable the anticipated transformational results.

Fifty percent of the Evaluation Panel's consideration of your proposal is based on how competitively your proposal addresses this evaluation criterion.

- Chapter 2 Section D.3 offers guidance on how proposers should address the evaluation criterion requiring that they adequately address the scientific and technical merit of the proposal. Fifty percent of the Evaluation Panel's consideration of your proposal is based on how competitively your proposal addresses this evaluation criterion.

The Evaluation Panel's review and recommendation is ultimately based on how well the proposal addresses all award and evaluation criteria.

Award Criteria	Essential Aspects	
A. Why TIP Support is Necessary	<ul style="list-style-type: none"> Why the project needs TIP funds The difference TIP funding will make to the research, the results and timing of those results, and the impact on the societal challenge 	
B. Efforts to Secure Alternative Funding	<ul style="list-style-type: none"> Provide a description of the reasonable and thorough efforts that the proposer(s) has made to secure other funding for the research, including: <ul style="list-style-type: none"> Internal sources External private sources Government sources Applies to all joint venture partner efforts relative to all sources, or why a source for a specific partner is inappropriate Documented evidence that alternative funding sources are absent or inadequate 	
Novelty, Part 1: C. Novelty of the Proposed Research (Technology) Results/Outcomes	<ul style="list-style-type: none"> Discuss other entities who may have similar research (technology) results available and differentiate your research How the research (technology) results are transformational Key performance metrics that differentiate the proposed research (technology) Science-based details explaining the research (technology) potential to more fully address the societal challenge 	
Award Criteria	Evaluation Criteria	Essential Aspects
D. Scientific and Technical Merit and may Result in Intellectual Property Vesting in a U.S. Entity	1) Scientific and Technical (S&T) Merit (50%)	<ul style="list-style-type: none"> Novelty, Part 2 : Novelty of the proposed research approach Potential to address technical needs associated with a major societal challenge High-risk, high-reward research Qualifications of the proposed research team A scientifically sound technical plan with tasks, milestones, timeline, decision points and alternate strategies
E. Strong Potential to Advance the State of the art and Contribute to the U.S. Science and Technology Knowledge Base	2) Potential for S&T and National Impacts (50%)	<ul style="list-style-type: none"> The research advances the state of the art whether or not it succeeds The differences the project will make to the broader research community The contribution to the U.S. science and technology knowledge base while ownership of the intellectual property is maintained How the contribution will support the transformational results
F. Strong Potential to Address Areas of Critical National Need by: <ul style="list-style-type: none"> Transforming the Nation's Capacity to Deal with Major Societal Challenges Generate Substantial Benefits to the Nation that Extend Significantly Beyond the Proposer 		<ul style="list-style-type: none"> The potential magnitude of transformational results upon the nation's capabilities How and when the ensuing transformational results will be useful to the nation The capacity and commitment of each award participant to enable or advance the transformation to the proposed research results (technology).

Table 2.2: TIP Award and Evaluation Criteria

(D.1) AWARD CRITERIA REGARDING “WHY PROPOSE TO TIP?”

In the first section of the Project Narrative, the first two TIP Award Criteria (see Chapter 1 p. 10) should be addressed:

1. Why TIP Support is Necessary
2. Efforts to Secure Alternative Funding

As plans for the impact and technical goals begin to develop among the proposing team members, it is important to tie together the concepts of why support from TIP is necessary and the efforts made by the proposer(s) to secure alternative funding to accomplish the research envisioned.

1. Why TIP Support is Necessary

In this section describe why the project needs TIP funding (Award Criterion A). A competitive proposal will minimally include the following:

- a. A discussion of why this specific project needs TIP funds. Do not merely restate the solicitation or discuss the technical area in general.
- b. A discussion of what will happen to the project with and without TIP funding, including the consequences to the research and the impact on the societal challenge(s). Include any evidence that the research will not be conducted within a reasonable time period in the absence of TIP funding.

2. Efforts to Secure Alternative Funding

The second criterion (Award Criterion B) requires that the proposer demonstrate that reasonable and thorough attempts have been made to secure funding for the proposed research from relevant alternative sources before applying for TIP funding, and that no alternative funding sources are reasonably available to support the project. Information about the efforts that have been made and the reasons for not receiving those funds are an important part of TIP's evaluation of your proposal. TIP's first two statutory Award Criteria require that proposers have reasonably and thoroughly sought alternative funds, but that such funds are not available or not available within a reasonable time period (e.g. the time period critical to a window of opportunity for realizing the impacts from the project).

In this section, each proposer, including each joint venture member if a joint venture, must address and adequately describe their efforts to obtain for their proposal:

- a. Internal funding.
- b. External private funding.
- c. External public (government) funding.

If one of these sources is unavailable to a proposer or one of the joint venture proposers, indicate that this type of funding is unavailable, and the reason(s) why it is unavailable. Without the reasons behind the unavailability of each type of funding, your rationale for why TIP support is necessary is not likely to be competitive and your proposal may not pass Preliminary Review.

Internal funding includes working capital, retained earnings, and other internal resources for companies and research funds for universities. Include a discussion of the decision-making process and priorities the organization uses for allocating internal funds for research and development. For companies, this is especially important if the proposed technology is part of the core technology of the organization. Provide the reason(s) why efforts to obtain internal funding were not successful or not appropriate for the project being proposed. Where did the proposal rank in your organization's internal review and why?

Each proposer, including each joint venture member if a joint venture, must also describe its reasonable efforts to seek funding to support the proposal from external private sources. For companies, this includes angel investors, venture capital funds, financial entities, and industry partners. For universities, this includes foundations. Discuss the reason(s) why these efforts were not successful or not available. Be sure to include a discussion of how private investors viewed the technology risk and timing associated with the proposal's approach.

Finally, describe the effort that each proposer, including each joint venture member if a joint venture, made to seek funding from other public (government) sources (federal, state, or local). Describe any past or current submissions or efforts to seek funding that have been made to other government agencies and the outcome or current status of those submissions or efforts. If there are other relevant sources of public (government) funds that have not been contacted, explain why not.

Proposals that clearly and fully address why each type of funding, internal or external private sources, and external public (federal, state, and local) sources, is unavailable may be more competitive.

For joint ventures, a table listing all the members and indicating their efforts in all three areas can be helpful for completeness. A summary table providing more descriptive text would likely be more competitive.

For all proposers, include at the end of the proposal any letters documenting efforts to secure other funding for the proposed research and why funding was not furnished. If no letter is available, then provide, as an appendix, a table with a brief paragraph for each unavailable letter or additional documentation of the effort, including: the name(s) of the person(s) who formally decided not to fund the project, their title and organizational affiliation, the reason given for the decision, the date the decision was conveyed, and to whom the decision was conveyed. Neither the letters, nor the sum-

mary table of descriptions documenting specific contacts with potential funding sources, counts against the proposal page limit. The lack of this information may seriously weaken your proposal, potentially causing it to be deemed uncompetitive or to not be considered for further review.

(D.2) AWARD AND EVALUATION CRITERIA REGARDING IMPACT PLANNING

In this section of the Project Narrative, the proposer addresses the likely impact of developing the proposed technology. TIP recommends that this impact assessment address the novelty of the proposed research (technology) outcome (Award Criterion C), the ability of the technology to advanced the state of the art (Award Criterion E), and the ability of the technology to address the societal challenged identified under the competition's area of Critical National Need (Award Criterion F). (See Table 2.2 for the breakdown of the Award and Evaluation Criteria, p15.)

The three Award Criteria as outlined below are important to the evaluation of the proposal. Uncompetitive proposals often have a credible technical plan, but fail because the Strong Potential to Advance the State of the art and Contribute to the U.S. Science and Technology Knowledge Base (Award Criterion E) and Potential for S&T and National Impact (Award Criterion F) are discussed as an afterthought. In planning the development of the proposal, it is important to consider the research outcome (Award Criterion C) in conjunction with the Evaluation Criterion 2, which expands Award Criteria E and F.

Successful proposers must adequately elaborate on all of the following elements:

Award Criterion:

Novelty of the Proposed Research (Technology) Outcomes (See Chapter 1 p. 10 – Award Criterion C)

Evaluation Criterion:

Potential for S&T and National Impact (See Chapter 1 p. 10 – Evaluation Criterion 2, which expands on Award Criteria E and F)

- Strong Potential to Advance the State of the art and Contribute to the U.S. Science and Technology Knowledge Base (See Chapter 1 p. 10 – Award Criterion E)
- Strong Potential to Address Areas of Critical National Need (See Chapter 1 p. 10 – Award Criterion F)

By asking the proposer to lead with a discussion of the proposed impact of the technology, rather than its scientific and technical merit, TIP illustrates the importance of focusing upon how the proposed technology will address the societal challenge within the selected area of Critical National Need. Indeed, during the TIP proposal evaluation process, the Scientific and

Technical Assessment (Award Criterion D which is expanded under Evaluation Criteria 1) is equally important as Impact Assessment (Award Criteria E and F which are expanded under Evaluation Criteria 2).

Therefore proposers must not treat the impact assessment lightly. Proposals that fail to adequately address the impact of the proposed technology and instead only emphasize the scientific and technical merit will not be viewed as competitive in the proposal evaluation process.

1. Novelty of the Proposed Research (Technology) Results With Respect to Competing Developments

TIP requires that proposals explain the novelty of the research (technology) and demonstrate that other entities have not already developed, commercialized, marketed, distributed, or sold similar research results (Award Criterion C).

TIP evaluates novelty from two perspectives:

- novelty of the expected research results or outcomes (addressed here as Award Criterion C), and
- novelty of the research approach itself (addressed later in this chapter as Award Criterion D).

Begin by describing the existing state of the art that is closest to the topic of your proposal. Provide technical and commercial baselines from which to measure all future transformative research results. Illustrate your point of view by discussing similar or competing research results (technologies) that other entities appear to have developed, commercialized, marketed, distributed, or sold. Identify these efforts and explain in scientifically based detail why your proposed research results (technologies) are novel and extend the state of the art. Provide specific examples within your bibliography that demonstrate the claims of novelty and reference potentially competing efforts. Specify why your potential research results or research outcomes (technologies) have the potential to more fully address the societal challenge(s), while the apparently competing technology that already exists does not, will not, or could but to a significantly lesser extent, in a manner that is clearly stated.

When discussing the novelty of your proposed research results or research outcomes (technologies) against similar or competing solutions, keep the following in mind:

- What are the key systems requirements and performance metrics for your proposed solution, and how do they differ from current technologies or potentially competing results and extend the state of the art?
- How are your research outcomes (technologies) transformational and how do they enable a disruptive change over and above current methods and strategies?

A direct comparison of requirements and metrics associated with the proposed effort against competing technologies can be criti-

cal to making a proposal competitive, and demonstrates this first aspect of novelty required by Award Criterion C.

2. *What is the potential for advancing the state of the art?*

In this section, the proposer(s) will address how the research can advance the state of the art and contribute significantly to the U.S. science and technology knowledge base (Award Criterion E and Evaluation Criterion 2). Successfully accomplishing the proposed research and surmounting the technical challenges should result in a dramatic transformational change in the future direction and state of the technology. This path change should be a major leap forward, advancing the state of the art significantly. Proposers should include three key elements in their description of the transformational change:

a. **What might advancing the state of the art look like in terms of impacts?**

Competitive proposals will thoroughly explain how the proposal advances the state of the art and elaborate on all of the following elements:

- Identification of the state of the art. Provide quantified technical and commercial baselines from which to measure all future transformative research.
- Explanation of the differences that complete success, partial success, and failure will make to the state of the art.
- Effects that knowledge of the project results will have on the broader research community, especially to a particular societal challenge in an area of critical national need outlined in the FFO. Discuss how a failure or partial success may still offer some, although clearly a lesser benefit, to other researchers in the field.

b. **What are the potential pathways for the impacts?**

Describe how research results and contributions to the U.S. technology knowledge base will be disseminated beyond the proposed participating organization(s). In addition, describe how the project participants maintain and/or protect ownership of the core knowledge needed to most effectively implement the project's technical results for reaching the proposed impacts. Describe the following:

- Preferred strategy for disseminating the research results and the commercial implication of the dissemination.
- Preferred strategy for intellectual property ownership.
- Timeline for both knowledge dissemination and commercial implementation.
- The specific role of each project participant in each element of the strategy.

- Involvement of others beyond the project team in the knowledge dissemination and commercial strategy.

The strategy above may combine diverse elements such as:

- Patenting and licensing along with a description of any intellectual property issues that might limit project participants' freedom to operate commercially.
- Partnerships with potential commercialization partners and users. Describe in detail who these partners are and their role(s) in the preferred commercialization strategy.
- Partnerships with potential knowledge dissemination partners and users. Describe in detail who these partners are and their role(s) in the preferred dissemination strategy of research outcomes.
- Demonstration projects and their critical role in validating the technology and providing access to commercial pathways.
- Publishing papers or textbooks.
- Conference presentations or seminars.
- Teaching or training.

c. **How might the impacts cross disciplines or industries?**

Be sure to consider how the dissemination strategy will reach across all the U.S. disciplines and industries that could benefit from the research results. The dissemination strategy should show how knowledge of the project will reach the U.S. research community and change the state of the art. Describe the implications on the technical, academic, and commercial sectors in the United States.

3. *Transforming the Nation's Capacity to Deal with Major Societal Challenges*

In this section, the proposer(s) must address the following issues contained in Award Criterion F:

- How the research (technology) has strong potential to address societal challenge(s) in the area of critical national need outlined in the FFO.
- How the benefits will extend significantly beyond the direct return to the participants in the research.

Competitive proposals will thoroughly elaborate on all of the following elements of this criterion:

- An analysis of the potential magnitude of the transformation or change across the nation, including any planned commercial consequences.
- An implementation plan that explains how and when results

of the proposed technology will have positive effects on the project participants and the nation more broadly.

- The capacity and commitment of all project participants to enable or advance the transformation, dissemination of research results, and any commercialization of the proposed research results (technology).

Competitive proposals will clearly define the societal challenge that the proposed technology is trying to solve in sufficient detail to enable clear links to be made between the problem to be solved, the proposed solution, the dissemination of the solution, and the potential for overall impact on the Nation.

a. Analysis of the potential magnitude of the transformation or change across then nation, including any planned commercial consequences.

Describe how the nation’s capabilities to address the societal challenge(s) in an area of critical national need will be significantly enhanced once the results of this research are put to use. Include in your discussion a quantification of the current baseline in the Nation’s commercial or research capabilities.

Competitive proposals will provide a description of the magnitude of the impact or difference that the technology will make. Describe any assumptions and document and quantify expected outcomes wherever possible. For example, benefits in health-care could be reducing a specific number of accidental deaths due to errors in surgical procedures along with expected cost savings; benefits from developing new sources of sustainable energy could reduce the Nation’s dependency on foreign energy sources. Be as specific and as quantitative as possible.

For expected improvements to research effectiveness consider cost, quality, pace, and volume of research outcomes currently being achieved compared to what improvements could be achieved if the project is successful. These improvements may not require a commercial product, but could require a plan to market research tools and/or methods to the scientific community beyond publications in the literature. Describe specific approaches to reach the quantified impacts being proposed for research tools and/or methods.

Be clear in the discussion about the difference or added value that TIP funding makes in realizing the societal benefits of the proposed project. In general, the competitiveness of a proposal may be strengthened through a clear description of the specific change expected and the potential impact in solving societal needs.

Be sure to make clear how the results could extend beyond the initial targeted societal challenge(s).

b. An implementation plan that explains how and when results of the proposed technology will have positive effects on the project participants and the nation more broadly.

Explain how the research results will be put to use to address the societal challenge(s). How will the research results (tech-

nology) move from the research team to those who will use it to address the societal challenge(s) either in future research or commercial endeavors? What strategies will be employed inside or out of the proposing team to realize the transformation? Competitive proposals will adequately discuss at least the following considerations:

- Identification of organizations that will implement the project results in usable systems or in new research approaches.
- Identification of the potential first users (early adopters/testers) of the implemented outcomes.
- Specific strategies to overcome barriers to technology adoption by research and/or commercial users.
- Timelines for reaching the first users and the broader community of potential users.

There will be limited positive impact on the nation if the research outcomes (technology) cannot or will not be implemented. Identify barriers (such as technical, regulatory, commercial, or cost related issues) that could hinder the full implementation of the proposed research outcomes (technology) if the research project is successful, and describe how and when these barriers will be overcome. Describe the timeline for implementing the research results.

If this research will result in technology that is part of a larger system, describe any other technical breakthroughs that are needed to make this research useful to the nation. How and when will the research and development needed for this technology take place? Who is likely to provide the technology? Develop strategies to include these players and the technology in the overall pathway to impacts, along with appropriate strategies to avoid any limiting intellectual property.

Competitive proposals should clearly define the societal challenge that the proposed technology is trying to solve in sufficient detail to enable clear links to be made between the problem to be solved, the proposed solution, the dissemination of the solution, and the potential for overall impact on the nation.

c. The capacity and commitment of all project participant to enable or advance the transformation, dissemination of research results, and any commercialization of the proposed research results (technology).

This section of your project narrative should address the following areas regarding **Organizational Commitment**:

For each participant, describe the organization’s effective commitment to performing the research proposed and to enable or advance the transformations if the research is successful (whether through research dissemination or commercial activities).

First, the commitment encompasses all resources to be brought to performing and completing the research within the TIP project including:

- Financial resources.
- Time commitment of key people in the organization.
- Equipment.
- Dedicated facilities.

Second, this organizational commitment encompasses the commitment of each participant to enable or advance the transformation described in this section, during the project and after the project is completed. What resources will be available to execute the strategies being proposed? Describe how the team will function to enhance the implementation of this transformative technology, including how the team will manage and plan any commercial, marketing, manufacturing, and strategic planning endeavors, if applicable. Keep in mind that costs associated with commercialization and other dissemination strategies are not allowable project costs.

Describe the relationship of this project to each organization's strategic vision or mission, including a discussion of how technological success will be incorporated into the organization's research and/or commercial goals. Provide evidence of commitment from senior management to the project and an explanation of why they are interested in the research outcomes. TIP requires a letter of commitment signed by an authorized senior executive of the lead proposer and from each joint venture member. These letters must explicitly verify the availability of the total dollar amount of cost shared funds, including cost share proposed from each subrecipient, if applicable. If there are commitments from regional, state, or local agencies or private sources of capital to contribute cost share funds, indicate the nature of those arrangements and give evidence of the commitment. NOTE: Contractors may not provide cost share. Cost share by proposed subrecipients should be addressed in the applicant's letter.

(D.3) EVALUATION AND AWARD CRITERIA REGARDING SCIENTIFIC AND TECHNICAL PLANNING

Scientific and Technical Merit and How the Research May Result in Intellectual Property Vesting in a U.S. Entity (Award Criterion D expanded under Evaluation Criteria 1).

In this section of the TIP Project Narrative, the proposer(s) addresses the scientific and technical merit of the proposed project and how the research may result in intellectual property vesting in a U.S. entity. Successful proposers will adequately elaborate on all of the following elements:

1. The novelty of the proposed research approach.
2. How the research addresses the technical needs associated with a major societal challenge not currently being addressed.
3. The high-risk, high-reward nature of the research approach and potential outcomes.

4. A scientifically sound technical plan with milestones and associated metrics, and access to adequate resources (e.g. personnel with appropriate scientific and technical expertise, equipment, and facilities).

1. The Novelty of the Proposed Research Approach

To be competitive, the proposal must convince expert reviewers that the research project itself is novel. Novel research refers to the technical approach and means the research effort is new, uncommon, unusual and not currently being sufficiently addressed. The research approach itself can be completely novel or it can be a novel integration of existing or new technologies.

However, to be competitive, the proposed research is expected to be transformational (a dramatic challenge to the status quo), not just an incremental or predictable next step in the evolution of an existing technology, and not just a combination of existing technologies in a new format that is more appropriately characterized as an incremental product improvement. Transformational research enables disruptive changes beyond current methods and strategies, with the potential to radically improve the understanding of systems and technologies.

Therefore, describe how the proposed research is particularly innovative relative to alternative approaches being pursued by domestic and foreign competitors or elsewhere within the proposing team's organization(s). Who are the competitors and how is your proposed research approach novel? Describe any known related efforts that may have been unsuccessful, and how your approach avoids or otherwise addresses the pitfalls others may have encountered. Cite relevant patents and the open literature to support this discussion. Include in the discussion a list of the key words for your patent and literature searches to illustrate the detail level of your analysis.

In order to assess how transformational a proposal is, it is necessary to describe the details of relevant competing work (closest state of the art) to the proposal's idea using quantifiable metrics to clearly characterize the baseline starting point. Ignoring state of the art knowledge and ongoing work by others and within the proposing team's organization(s) may lead reviewers to assume the proposer is not aware of existing work. Discussing existing efforts helps to ensure that the difference between the proposed work and such efforts clearly merits TIP consideration.

State-of-the-art approaches that are competing with the technology you propose are considered to be the "performance benchmark" or the "status quo" that currently can be found "out there". The state of the art needs to be well described in your proposal, including specific numerical metrics. Attaching published error bars to those metrics is beneficial, if appropriate. The state of the art performance and/or the narrowing of the attached error bars may be presently beyond your own capabilities but the expectation is that the proposed project would advance the state of the art.

Competitive proposals will thoroughly explain how the proposal advances the state of the art and will elaborate on the following elements:

- Explanation of the differences that complete success, partial success, and failure will make to the state of the art.
- Differences that knowledge of the project results will make to the broader research community, especially in this area of critical national need. Note that knowledge of failure can benefit other researchers considering a variety of possible directions as well.

2. *How the research addresses the technical needs associated with a major societal challenge not currently being addressed*

To be competitive, the proposal will provide a credible case that the research result(s) has the potential to address the technical needs/barriers associated with the major societal challenge(s). Proposers should include the following:

- Identify the expected outcome(s) of a successful research plan.
- Define measurable success criteria for the proposed research or technology efforts and provide quantifiable measures. Link these measures to the key requirements and performance metrics discussed later in Chapter 2 Section D.3 (4). These measures should be explained and contrasted with those for the state of the art and any competing approaches.
- Explain how the research will specifically address a solution to the societal challenge(s) within the area of critical national need described in the FFO. Each of the major research outcomes should have a measurable, definable end point that correlates to the solicitation's discussion of a major societal challenge.

Proposals that are predominantly basic science, or that are only a best level of effort without specific targets for results and end points that are measurable and definable, may be considered less competitive even if these proposals have potential to address a major societal challenge within an area of critical national need.

3. *The high-risk, high-reward nature of the research approach and potential outcomes*

High-risk, high-reward research is core to TIP's purpose. A competitive proposal will demonstrate that the proposed research meets this requirement.

Describe the scientific risks or technical barriers that prevent significant advances in addressing societal challenge(s) within the area of critical national need described in the FFO. The proposal must clearly describe what and where the high technical risk challenges are that must be overcome for the project to succeed. Describing high technical risk also entails articulating how the results have the potential for far- or wide-ranging implications if the risks are overcome, as well as why the proposer believes the research may be too novel or spans

too diverse a range of disciplines to fare well in a traditional peer-review process. Merely expressing how costly the research plan may be is not an appropriate measure of high-risk associated with a scientific challenge.

Successfully accomplishing the proposed research and surmounting the technical challenges should result in a dramatic transformational change in the future direction and state of the technology. This "path change" should be a major leap forward, advancing the state of the art significantly. Describe how the proposed research meets this test.

Proposals should provide sufficiently detailed scientific rationale to document the specific high technical risks embodied in the proposed research. The proposal must describe the technical challenges and assess the probability of success of the proposed approach(es). Demonstrate that the technical approach(es) for overcoming the challenges are built upon sound, feasible scientific and/or engineering principles and foundations, based on early research evidence, or sound theoretical thinking. What relevant patents, open literature, or experimental results exist to support your discussion? TIP will not fund projects that violate sound scientific and/or engineering principles, or projects that propose to conduct a literature search after award to subsequently develop a detailed research plan.

TIP funds projects that seek to overcome extremely difficult technical challenges, many of which are cross-disciplinary. TIP also recognizes that not every aspect of the technical plan will have high technical risk; however, the technical plan overall for the project must have a risk profile that is considered to be high-risk, high-reward.

Research (technical/scientific) risk may be high in the development of one or more single innovations within the project, or in the integration of disparate technologies, or both. Integration risk can be due to the complexity of the integration effort, unknown properties of the components to be integrated, or other factors. Critical to an explanation of high-risk, high-reward for integration efforts is explaining what new knowledge could result from overcoming the risks and whether the risk is in the integration approach or in the technologies to be integrated. The high cost of integration by itself does not sufficiently justify a claim of technical high-risk, high-reward. For example, would the next similar integration project be "faster, better, cheaper" based on the outcome of this project? Or would the cost, time, and effort be about the same? Think about how to describe the potential knowledge/impact benefits from the approach of the integration effort, in addition to the potential knowledge/impact benefits of the final system, device, or method.

The proposal should also describe the technical and scientific impact (leverage or high-return) that will be derived from the research proposed. Technical leverage is the possibility of using the research results or approach beyond the initial applications. Summarize the technical impact and leverage of successfully accomplishing the proposed research and overcoming the high technical risks. It is often helpful to discuss technical impact and leverage from the perspective of a fully successful, as well as a partially successful, effort.

4. *A scientifically sound technical plan with milestones and associated metrics, and access to adequate resources (e.g. personnel with appropriate scientific and technical expertise, equipment, and facilities)*

A sound, detailed technical plan that addresses all aspects of this subsection is necessary for a proposal to be competitive. The technical plan must explain how the research and technical objectives will be reached. It must address the “what, how, where, when, why, and by whom” in substantial detail. It must anticipate likely scientific or technical problems and describe how these problems will be overcome. The technical plan should therefore detail each key research activity and provide the basis for project management oversight of that activity should TIP issue an award. A proposal will not be competitive if the first task consists solely of defining the metrics of the project. This would mean that the state of the art has not been properly studied in order to develop, at a minimum, the major task level metrics to guide the research.

In the case of a joint venture, the technical plan must demonstrate the required substantial involvement of the two (or more) core joint venture members, as explained in Chapter 1 Section B.2, p. 3. One way to accomplish this is to describe why the project’s technical results would not be possible without these core joint venture members. The technical plan also must show how each of the other joint venture members contributes to the technical research and outcomes.

Many proposals have been found not to be competitive, although they may have meritorious technical goals, because the proposal provides only a vague plan on how to reach the goals. It is not adequate to merely describe the established technical barriers and provide only an overview of the research pathways. TIP requires a more detailed technical plan to evaluate how the project goals will be met, and interim measures of progress (e.g. milestones with appropriate metrics) for key research tasks.

TIP must be able to track the project from the initial work to the end of the project results. A detailed technical plan and associated Gantt chart are critical for effective project management, for development of a reasonable budget, and for good communication between the TIP Project Manager and the Principal Investigator should the proposal be funded.

The elements of the technical plan must fit together in a reasonable and logical way to instill confidence that the team can implement and conduct the proposed approach.

The following sub-elements in the technical plan are required:

- a. **Tasks and Subtasks:** Discuss how the work will be organized into tasks and subtasks. Provide clear descriptions for tasks and subtasks performed by operational units within the proposing organization(s) as well as by any contractors or subrecipients. Clearly identify these contractors or subrecipients if known at the time of proposal submission. If the contractor or subrecipient is not known, provide the qualifications needed to perform the proposed work. Explain the technical rationale for the major tasks. Indicate the level of risk of each task (e.g. high, medium, low). Clearly link tasks in the budget to the performing organization(s), specifically, each joint venture

member if a joint venture, and to contractors or subrecipients (where appropriate). Highlight major risks and innovations inherent in specific tasks and the strategies, including alternate pathways, for managing unexpected results. High-risk research needs contingency plans, including alternate or parallel technical approaches for carrying out key portions of the technical work. Discussing these alternatives is part of a competitive technical plan. Highlight the level of risk and innovation inherent in each of these approaches in the proposal and compare them to the primary approach. Proposals that contain a considerable effort dedicated to alternate or parallel efforts that significantly reduce the overall proposal’s profile of research risk, or novelty of the research innovation, may be considered less competitive. For example, a proposal may be considered less competitive if a larger portion of personnel effort and overall costs are associated with lower risk alternate or parallel efforts than are proposed for the high-risk, high-reward efforts.

- b. **Interrelationship of Tasks:** Discuss how the tasks link to one another, which tasks depend on others, which tasks are sequential, and which tasks can be done in parallel. If contingency plans are used in the event the primary approach is unsuccessful, describe how these tasks will be incorporated, and under what conditions.
- c. **Milestones:** Provide appropriate interim and final key milestones for each year of the technical plan (by project years, not calendar years) and tie these to appropriate interim and final metrics for tracking progress toward successful results as shown in Table 2.3 below. Identify the organization(s) responsible for, and those with a key contribution to, each milestone. Milestones are critical for tracking progress made in the project. Include a discussion of the strategy for validating that a critical milestone’s metrics have been met.
- d. **Metrics:** Provide clear and concrete quantifiable metrics for measuring the project’s progress toward the overall technical goals (interim and final metrics) as shown in Table 2.3 below. Define what technical success would look like: these metrics should relate to the project’s technical objectives, targets, milestones, and success criteria. Quantify the extent to which this advances the current state of the technology. Metrics used at decision points to decide on proposed next steps are critical.

As a general rule of thumb, a project will typically have no more than four to six major quantifiable metrics per year that are associated with major technical accomplishments or decision points. More than six quantifiable metrics per year could indicate that the metrics may not represent significant advances in the research, but may provide project tracking value to the Principal Investigator. If a larger number of metrics is of benefit to the Principal Investigator than what is suggested, it is useful to state that the preferred project approach includes additional metrics. Fewer than four quantifiable metrics per year may make it difficult for the Principal Investigator and TIP to effectively track technical progress should the proposal be funded.

- e. **Decision-Point Strategy:** Provide decision-points and strategies for each go/no-go and other major decisions in the project as appropriate as shown in Figure 2.1 below. High-

Table 2.3: Milestones / Metrics Examples

Milestone	Timing	Responsible organization	Metric (Absolute Number)	Minimum Value for Successful Result	Test Method	Decision Point	Risk Level (H,M,L)
Material down selection	Y1Q3	Company 1	Figure of merit for performance (range of value such as 0.1 to 0.33)	Exceeds current technology by 200% above SO a metric (state metric)	Series of evaluation methods	1. Choose optimum performance or restructure	High
Matrix to support cell attachment, spreading and cell in growth timing	Y2Q3	Contractor	Timing for cell attachment and spreading throughout the matrix (range of values)	Uniform cell attachment within five minutes of seeding and spreading within 30 minutes at all levels of modular matrix	Use of RTP covalent coupling to enhance rates of cell attachment and support spreading	3. If coupling is not even throughout matrix, move from static to perfusion coupling to ensure reagent matrix contact	Low
Demonstrate functionality of candidate sensor tips	Y1Q2	Contractor 1	Figure of merit based on performance standards (range of values)	Sensitivity, spatial resolution, and power consumption within 70% of final targets	Verified test methods	Select superior candidate tip or reevaluate technical approach	High
Integrate and demonstrate catalysis synthesis, probe reaction, miniaturized analytical methods, and inform addicts system	Y3Q4	Company 1 (JV Lead & Company 2)	Generate two new candidate lead compounds for lab scale test using process-grade raw material feedstocks	Candidate compounds must show: a) 15% improvement in reaction yield at reduced reaction temperatures, and b) 50% higher selectivity in probe reactions	High throughput synthesis and analysis techniques	Explore different region of chemical composition space if lead compounds don't meet minimum requirements for success	Medium

Note: Express timing as Y1Q3 (Project year 1, quarter 3). Metrics are numbers, not a rephrasing of the milestone or other narrative.

risk research can fail. Well-defined decision points provide a roadmap in terms of milestones and metrics showing a validated, quantifiable way that a project or line of research has succeeded or failed. For example, if a new material passes a stress test at a milestone, the decision is clearly to continue. If it fails the stress test at that milestone by a significant amount, then the project plan may recommend a designated alternate approach. If the designated alternative fails, then the project plan may define this as a no-go decision point that terminates the project. Projects that pursue more than one technical approach in parallel must discuss how the decision to select among those approaches will be made, when it will be made in the decision-point strategy, and what quantifiable metrics are associated with making the decision.

A good decision-point strategy identifies early go/no-go decision points within the first 12-18 months of a 36 month project (or earlier for a shorter project). Appropriateness of the high-risk elements of the project should fall within this time frame. Risks, milestones, metrics, and decision points must be linked in the decision-point strategy. A decision-point tree or critical-path chart may be very helpful to communicate this information. It is important that the first decision tree that leads to a go/no-go point within the first 12-18 months of the project be inserted in the narrative, after a table listing Milestones/Metrics; subsequent decision trees may be attached at the end of the proposal, after the detailed Gantt chart. The location of this first go/no-go point must be correlated with the tasks in the Gantt chart. For instance, if Task 1 leads to initiating Task 2 through the first go/no-go point, then Task 2 cannot start before the end of Task 1. If it does, the need for this must be clearly

explained. One example of a decision-point strategy is given in Figure 2.1 above, but there are many other ways to effectively portray the information.

- f. **Gantt Chart:** Include a Gantt chart or other project timeline chart that illustrates timing of major tasks and key subtasks. These charts should include the level of risk associated with each task, the responsible individual(s) and organization(s), milestones with appropriately quantitative metrics and decision points, as appropriate, and should be consistent with your project and budget narratives. The timeline chart acts as a critical "task map" of your technical plan for TIP reviewers and for the overall project if it is selected for funding. The Gantt chart should be presented at the major task level in the body of the narrative (1 page only), readable without a magnifying glass, and given subsequently in detailed format at the end of the proposal (out of the page limit). In addition to the timeline chart, the project tasks must be described in narrative form. It must be clear how the goals of the project will be achieved by those tasks. See Table 2.4 below for an example. The same numbering system used for the major task level should be used in the narrative, the Gantt chart and the budget form NIST-1022E form (single applicants) or NIST-1022F form (joint ventures) so that reviewers can easily assess how major tasks fit together in terms of timing, milestones, metrics, resources, and cost etc.
- g. **Resource Planning:** As discussed in the introduction, identification and allocation of appropriate resources to achieve the proposed result is an integral part of a TIP Proposal. Team members may be single proposers, joint ven-

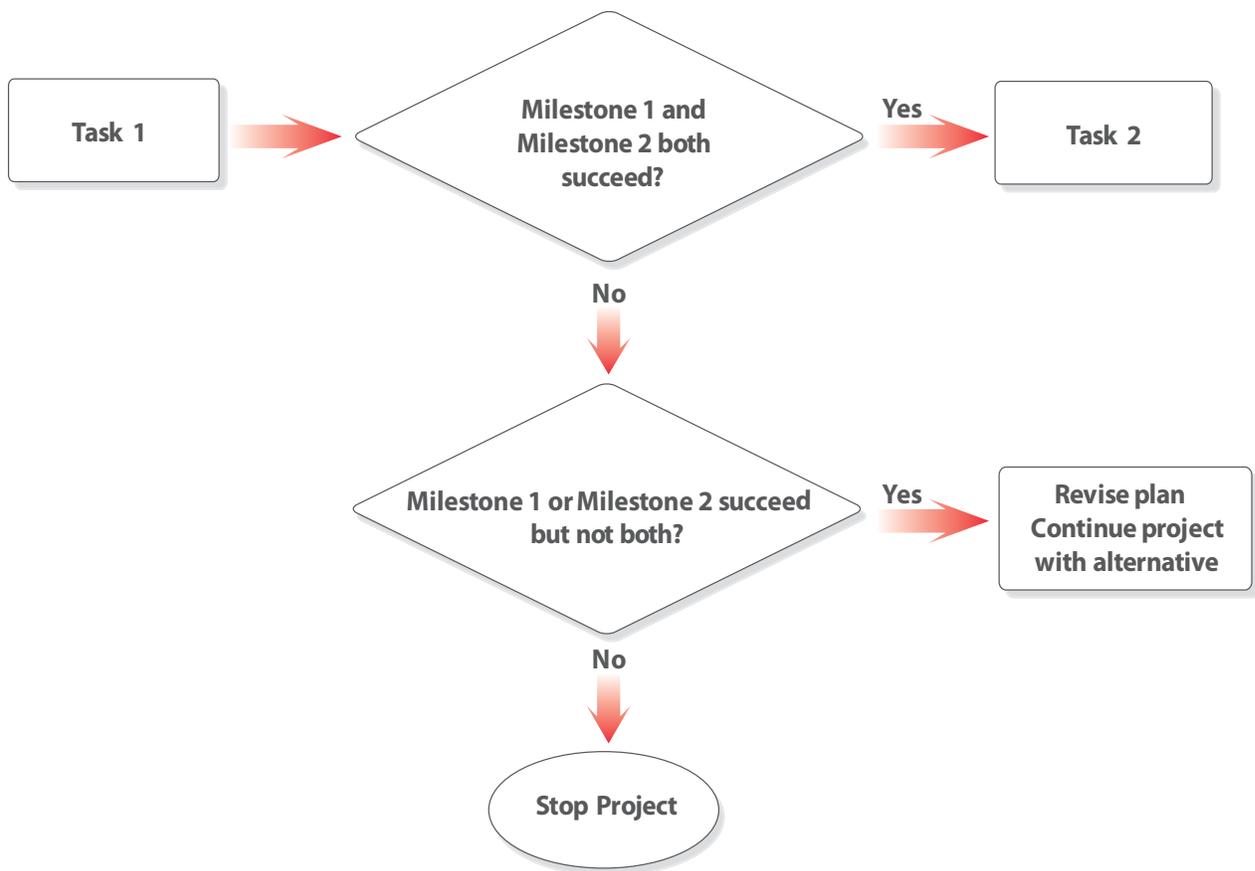


Figure 2.1: Decision-Point Strategy

ture members, contractors, subrecipients, and informal collaborators. Informal collaborators are those organizations or individuals that are not a part of the project’s budget but have a distinct role in helping the team accomplish their technical or impact objectives. Teaming is often critically important to successful proposals as multidisciplinary approaches are often required to advance the state of the art or for the results of the research to be adopted by others and to overcome the societal challenge being targeted. Some specific aspects of resource planning that need to be addressed in the proposal are outlined in the following sections.

(1) **Relevant Qualifications of Proposed Research Team:** In this section, the required information on key technical team members will be provided. Most projects require a multidisciplinary approach to overcome technical barriers. Describe the quality and appropriateness of the technical staff assigned to the project, and the amount of time each individual will allocate to the project. Briefly highlight the educational background and experience of key personnel named in the budget narrative. TIP may request two-page resumes for each key team member during the review by the Evaluation Panel. If key staff will be hired, describe the qualifications needed for key positions not yet filled and the timeline for hiring these staff. Information regarding qualifications of contractors and subrecipients should be described on the NIST-1022B form and as appropriate in the technical plan narrative for the tasks that involve contractors or subrecipients.

(2) **Adequacy of Facilities, Equipment, and Resources:** Briefly discuss the research facilities and specialized equipment required for this proposed project. Identify what facilities, equipment, and resources already exist for use; what will be obtained through contracting or through involvement of subrecipients; and what must be obtained even though sources are not yet identified. Provide the timeline for obtaining needed facilities, equipment, and resources. Major equipment purchases need to be clearly linked to the appropriate research tasks and described in the project budget narrative. Any collaboration or user fee agreements for access to facilities and/or associated staff being claimed as critical to tasks in the proposal must be clearly described. Copies of these agreements may be requested during the review by the Evaluation Panel (e.g. using a federal laboratory facility to perform research tasks in the proposal under a user agreement, CRADA, or other written agreement). Descriptions of verbal agreements between parties for facilities access are not likely to be considered as competitive as written agreements, and may not be compliant with the requirements of the Program.

(3) **Contractors and Subrecipients:** Projects may include contractors and subrecipients to obtain key expertise, access to existing facilities, or specialized goods and services. Discuss what each contractor and subrecipient brings to the project. Clearly identify what each will do and why that contractor or subrecipient was chosen. Please note that contract awards and subawards must be in accordance with the Procurement Standards found in 15 C.F.R. Part 14. Discuss the relationship

Project Tasks		Budget	Risk	JVL or SA						Project Year 1				Project Year 2					
				JV2	JV3	SUB1	SUB2	SUB3	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
Task																			
1	SPECIALTY ALLOY DESIGN			x		x	x												
1.1	Modeling	\$50,000	M			x			x										
	Milestone (M#) / Deliverable (D#):																		
	M1: predicting alloy chemistries			x	x	x													
	D1: metric (number) assoc. to alloy chemistries			x	x	x													
1.2	Trial heats	\$10,000	L	x															
1.3	Microstructure evaluation	\$10,000	L	x															
	Deliverables:																		
	M2: model validate new specialty alloy			x	x	x													
	D2: microstructure with stable grain size (number)			x	x	x													
	GO/NO GO1: Can new specialty alloy satisfy initial requirements (specify numeric target)?		H	x	x	x													

Table 2.4: Project Gantt Chart Example (Partial)

of the work to be done by the contractor or subrecipient to the technical plan. Discuss how their progress will be monitored and redirected as appropriate. Contractors may not contribute to the cost-sharing requirement. Subrecipients may contribute direct and/or indirect costs to the cost share of the recipient.

The following guidance should be considered when submitting a proposal to TIP that includes contractors or subrecipients:

- TIP expects that the proposer, or the joint venture members if a joint venture, will direct and carry out most of the key high-risk and high-innovation tasks.
- A single company structured as a virtual company that proposes to have contractors and/or subrecipients perform most of the high-risk tasks or passes a major percentage of the funds through to the contractor or subrecipient is not expected to be competitive, or may not be eligible for an award.
- A minimal joint venture structure (i.e., two joint venture members) in which one joint venture member does not have employees performing research, but outsources all their research activities to contractors and/or subrecipients, is not likely to be competitive, and the joint venture structure is potentially ineligible for an award (see Chapter 1 Section B.2).

In system or device integration projects, the proposal should make clear how the proposer(s) are involved in integrating the technologies and taking the system forward if contractors and/or subrecipients are key players in the actual integration tasks. Another way to think of this is to describe who is developing the new-to-the-world knowledge in the integration effort.

Projects with high levels of contracting or subawards need to specifically address how the proposed structure is effective

in terms of cost, organizational efficiency, and long-term impact of the research results.

- (4) **Justification for R&D Activities at non-U.S. Sites:** TIP strongly discourages use of non-U.S. sites for research and development activities. In the event that the project includes work performed at a non-U.S. site, a completed NIST-1022H form, "R&D Work Performed outside the United States by the Recipient or Contractor Questionnaire" (see Exhibit 11 at the end of Chapter 7) must be provided. This form is also required if a subrecipient is expected to perform work outside the United States for a proposer. If a portion of the project can only be carried out at a non-U.S. site because of the site's unique capabilities, the answers to the questions in NIST-1022H form should explain the technical work to be done, the relationship of this work to the overall project, the cost of this work, the unique capabilities associated with the non-U.S. site, and why equivalent work cannot be performed within the United States.

E. OTHER INFORMATION

1. Organizational Information

TIP needs to know about the capacity of applicants to perform the research proposed and their current financial/organizational status should the project be funded. Financial statements for contractors and subrecipients are not required.

For companies, provide:

- Date and state of incorporation.
- Ticker symbol if publicly traded.
- Company ownership including names of individuals and investors and percentages held.

Company/Organization Name:

Financial Information	Current Year to Date	Last Year	Two Years Ago
Income			
Contract R&D			
Product Sales			
Services Other Than Contract R&D			
Other			
Total Income			
Expenditures			
Cost of Goods Sold			
R&D			
General And Administrative			
Total Expenditures			
Gross Income Before Taxes			
Net Income After Taxes			
Balance Sheet	Current Year to Date	Last Year	Two Years Ago
Assets			
Current Assets			
Fixed Assets			
Total Assets			
Liabilities			
Current Liabilities			
Long-term Liabilities			
Stockholders' Equity			
Total Liabilities And Equity			
Employment Information	Number of Employees		
	Current Year to Date	Last Year	Two Years Ago
Full Time			
Part Time			
Full Time R&D			
Part Time R&D			

Table 2.5: Financial, Employment, and Ownership Information for Previous Three (3) Years

- Table 2.5 worksheets (see above) must be provided for each privately held company that is a proposer or joint venture member as an appendix to the proposal. The worksheet does not count toward the page limit.
- Source of cost share funding.

2. Current and Past Federal Awards

For other organizations, provide:

- Type of organization (i.e., institutions of higher education, state agency, etc.).
- Relationship to any parent organization.

Provide a list of all current and past federal R&D contracts, grants, and other awards for the previous five years and all pending federal awards in the general area of this proposal. For example, provide a list of the Small Business Innovative Research (SBIR), National Science Foundation, Department of Energy, National Institutes of Health, and other grants

Company/Organization Name:

Project Title	Award No.	Total Federal Award (\$)	Performance Period (M/Y to M/Y)	Name of Principal Investigator, Address, & Phone No.	Name of Federal Agency, Federal Program Manager, Address, & Phone No.

Table 2.6: Federal Awards Received By Company/Organization or Principal Investigator for All Technologies for Previous Five (5) Years

received in the technical area of this proposal for the previous five years. Include the name of the project, the funding agency/organization, the number of the grant/contract/award, the principal investigator, and the federal government contact’s name and phone number. For current or past awards having some relationship to the technology being proposed to TIP, briefly describe how the proposed project is distinctly different and not a duplicative effort. See Table 2.6 for the required format. This can be provided as an appendix and does not count toward the page limit.

3. Required Letters

TIP reviewers scrutinize the content of letters very carefully to understand the actual commitment of the signatory. Letters do not count as part of the page limitation of the proposal. Table 5 below summarizes which letters are required under what conditions. The remainder of this section discusses what each type of letter should contain and discuss.

a. Letters of Commitment

Letters of commitment obligate specific resources to the project if the project is funded.

- (1) **Single Company Proposer:** A letter of commitment from an authorized senior executive of the company is required to indicate the importance of the project to the company and the company’s commitment to supply key resources (e.g., the time of key personnel, cost-sharing, equipment, and facilities). The cost share dollar amounts provided in the letter must match the NIST-1022E form. Requirements regarding subrecipients that should be in the letter of commitment are explained below under (4).
- (2) **Joint Venture Proposer:** A letter of commitment from an authorized senior executive of each organization member of the joint venture is required to indicate the importance of the project to the organization and the organization’s commitment to supply key resources (e.g., the time of key personnel, cost sharing, equipment, and facilities). In addition, the NIST-1022D form “Third Party In-Kind Contributions” (see Exhibit 7 at the end of Chapter 7) must be completed, if appropriate. The cost share dollar amounts provided in

the letter must match the NIST-1022F form. Requirements regarding subrecipients that should be in the letter of commitment are explained below under (4).

- (3) **Contractors:** Letters of commitment from contractors who are key to the technical plan’s success are useful for verifying the availability of resources, but are not required.
- (4) **Subrecipients:** Letters of commitment from subrecipients who are key to the technical plan’s success are useful for verifying the availability of resources, but are not required. The entity that will manage the subaward should include information regarding any planned cost share contribution from a subrecipient in their letter of commitment. If an award is issued, the recipient is ultimately the entity that is committing to the cost share being obtained from the subrecipient. If a subrecipient fails to meet the cost share expectations, the award recipient is required to meet the shortfall. In addition, applicants planning to use subawards are responsible for evaluating the financial viability of subrecipients to meet proposed cost share levels.
- (5) **Prospective Employees:** Letters of commitment to join the proposing organization’s team are useful for verifying the availability of key personnel who are not yet employed at a proposing organization (single proposer, joint venture member, contractor, or subrecipient) to participate in the project if the project is funded. These letters are not required but they can play an important role in conveying the appropriateness of key staff members, especially for projects involving small companies or startups.
- (6) **Letter of Commitment for Third Party (External) In-Kind Contributions:** A letter of commitment from an authorized senior executive of any organization providing third party in-kind contributions that are to be used as cost share is required. This letter should clearly state the form(s) of the third party in-kind contribution, value of the in-kind contribution, and the time period over which the third party in-kind contribution is to be made. The dollar amounts provided in the letter must match the NIST-1022D form.
- (7) **Letter of Commitment for Third Party (External) Cash Contributions:** A letter of commitment from an authorized senior executive of any third-party (external) organization providing cash contributions that are to be used as cost share is

required. This letter should clearly state the amount of the cash contribution, the time period over which the third party cash contribution is made, and interim performance requirements for phased contributions, if any. The dollar amount(s) provided in the letter must match the NIST-1022E form (single applicants) or NIST-1022F form (joint ventures).

b. Letters of Support

Letters of support indicate willingness for organizations to become involved later in the project if it is funded. General letters of support for the project do not make the proposal more competitive unless the organization/person supporting the project is planning to provide funding, to participate in diffusing the technology/impacts from the project, or to become part of the project to actually help perform specific research that at the outset of the project may not be needed.

- (1) **Contingent Funding:** Sometimes a potential investor will indicate a strong interest in evaluating the results of a project for possible future uses. This type of letter can help verify that the pathway to further uses of the research in the proposal has been studied and is feasible. If this funding is critical to the financial viability, or is critical to or may be used as cost share of the organization, a letter is required.
- (2) **Strategic Partner:** Strategic partners can aid the future potential for the research to yield transformational results and in the diffusion of the technology beyond the proposer. Letters of support from strategic partners that demonstrate that the research has the potential to yield transformational results and is likely to benefit the nation are helpful in the proposal evaluation process. If letters are not available, but there has been some contact with a potential strategic partner, the proposer may document the contact in a paragraph, providing name, title, organizational affiliation of the contact, date of the contact, and extent of the contact. This paragraph can be included as an appendix, and does not count toward the page limit.
- (3) **Potential Additional Research Performer:** This might be an additional contractor to a single company award, or an additional joint venture member, or contractor to a joint venture that may become necessary if a particular alternative approach in the technical plan becomes critical. However, this entity is not currently listed in the proposed budget and budget narrative.

c. Letters of Corroboration

Letters of corroboration documenting each proposer's efforts, including each joint venture members' efforts if a joint venture, to secure other funding prior to seeking funds from TIP are required. Specifically, proposers must include letters from potential funding sources indicating why they chose not to fund the project or a very similar research effort. If such a letter is not available, proposers must document the interaction with funding sources as discussed in Chapter 2 Section C.2 entitled "Efforts that the Proposer Has Made to Secure Alternative Funding."

Information documenting such efforts should include the following:

- Name and title of the person who decided not to fund the project or very similar research effort.
- Organizational affiliation.
- The reason given for the decision, and
- The date the decision was conveyed, and to whom it was conveyed.

Proposers must provide this information in table format for each funding source that was approached and declined to fund the project. This table does not count toward the page limit.

Type of Letter	Required	As Appropriate
1. Letters of Commitment		
a. Single Company Proposer	Required—signed by authorized company official to document commitment of cost share and other key project resources. Must cover cost share that may be provided by subrecipient(s), but for which the company is held accountable.	
b. Joint Venture Proposer	Required from each joint venture member—signed by authorized organization official to document commitment of cost share and other key project resources. Must cover cost share that may be provided by subrecipient(s), but for which the joint venture member is held accountable.	
c. Contractors & Subrecipients		Optional—useful if contractor or subrecipient is critical to project
d. Prospective Employees		Optional—useful if key personnel are not yet organization employees
e. Third Party In-Kind Contributors	Required—signed by authorized organization official to commit third party in-kind contributions.	
f. Third Party Cash Contributors	Required—signed by authorized organization official to commit third party cash contributions.	
2. Letters of Support		
a. Contingent Funding	Required when funding may become part of the cost share of the project.	
b. Strategic Partners		Optional—Letters from or descriptions of contact with potential strategic partners
c. Potential Additional Research Performer	Required if the organization/person is associated with a critical alternative research approach identified in the research plan, but is not originally part of the project budget, if the project is funded.	
3. Letters of Corroboration		
Letters of corroboration, documenting efforts to secure other funding	Required—Letters from or descriptions documenting contact with funding sources and the outcome.	

Table 2.7: Summary of Types of Letters – Required or As Appropriate



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