

UNITED STATES DEPARTMENT OF AGRICULTURE

Module 2

<https://wisconsinctc.org/>



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or **yellow text**

click on them to follow a link.



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Contact Program Manager



What are Technical Objectives?

These are the goals that you want to achieve, and essentially, why you need the funding. They are “What you want to achieve;” rather than “What you want to do.” Probably the most common error seen in proposals overall, is that the Aims or Objectives are weak and don’t have quantitatively measurable endpoints.



Think of the Executive Summary page as an abbreviated version of the full grant. By having this page well written and well-thought out, the remainder of the grant application will be easier to write. Put strategic thought into every sentence on the executive summary page.

The Technical Objectives section is central to your grant proposal and should be the first section written to send to the program manager.

Feasibility

Determine the most difficult aspect of the proposed technology that must be overcome to show that it's technologically feasible. Proving feasibility is the point of Phase I. If there is only enough time and money to answer one question for Phase I, focus on feasibility.

Determine Aims by:

Working backwards

- What is your final product?
- What do you have to do in Phase II to have a prototype?
- What needs to be done in Phase I to enable Phase II?

Working forwards

- What are 2-3 research questions to reduce technical risk?
- What are the shortfalls in the state of the art?
- What do you do to address these shortfalls?

Check out related videos

- What's the point?
- What do you want to accomplish?
- List the objectives in bold type.
- What do you need to achieve?
- Make your milestones market-relevant.
- Proposal Roadmap and Pitfalls.



TECHNICAL OBJECTIVES HOMEWORK

PROVIDE THREE TECHNICAL RESEARCH QUESTIONS BELOW

TECHNICAL OBJECTIVES EXAMPLES

OBJECTIVE

Construct a system to measure substance X in wastewater to improve data simulations. We plan to use tool Y to measure because it has been shown to be most accurate.

MILESTONE

The future product must have a minimum sensitivity of X picomoles/mL, and have an accuracy of XY%. These specifications have been determined to be necessary by [insert market reason or standard benchmark justification].



TIPS

Try to make a simple statement with 1 or 2 sentences. Include quantifiable criteria in your milestones that demonstrates when you are done with this phase of Product Development.

Objectives demonstrate product feasibility. These **MUST BE** successful to advance to Phase II.

Volatile organic compounds (VOCs) have been implicated in direct health effects, odor, and the formation of particulate matter. VOCs have a high vapor pressure and low water solubility. Many are human-made chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants. VOCs typically are used as industrial solvents, such as trichloroethylene; fuel oxygenates, such as methyl tert-butyl ether (MTBE); or by-products produced by chlorination in water treatment, such as chloroform. VOCs are often components of petroleum fuels, hydraulic fluids, paint thinners, and dry cleaning agents. VOCs are common ground-water contaminants.

IDEA Labs proposes to utilize our patent-pending non-paraxial multipass cell (NPMC) method coupled with a widely-tunable mid-infrared quantum cascade laser to develop a portable analyzer capable of making rapid (1 Hz) measurements of volatile organic compounds (VOCs) at trace levels (ppb-levels). The system will provide speciation and concentration of VOCs aboard a mobile platform for studies of pollutant emissions and their impact on air quality to specific neighborhoods.

SA 1: We will fabricate the hardware electronics and software for the prototype mobile analyzer. After laboratory testing to determine the sensor's analytical performance on select VOCs the unit will be integrated into a vehicle and used for VOC quantification and speciation in urban and rural areas. (6-9 months)

TECHNICAL OBJECTIVE HOMEWORK

FILL IN YOUR INFORMATION BELOW

Objective 1: Goal and Quantifiable Milestone

Objective 2: Goal and Quantifiable Milestone

Objective 3: Goal and Quantifiable Milestone

Tie Objectives to Significance



DRAFT EXECUTIVE SUMMARY PAGE



The following pages will outline this single page document highly suggested to submit to the program manager.

Outline of Executive Summary Page

CONSIDER THESE STARTER PHRASES WHEN WRITING

- Introduction
 - Company (One sentence): We are a X University startup formed to commercialize Y technology from the Agricultural School.
 - Goal: The goal of this SBIR is to develop [product] to address [state problem].
- Significance:
 - Problem to be solved: The problem is ... and as a result [defined group of people] suffer.
 - Gap in knowledge: Existing solutions fall short because...
 - Prelim Studies: We have discovered [1-2 sentences on innovation and promise to solving problem]
- Product: The product of this SBIR is ..(1 sentence)
- Long term impact: We envision [product] being used to...[1 sentence]
- Executive Summary: Include your drafted objectives.
- Expected Outcomes: Completion of the above aims prove feasibility of product to [meet a market need] (2 -3 sentences)
- Plans for Phase II: Upon successful completion of Phase I, Phase II will focus on [1-2 sentences on scaling goals]
- Commercial Application: This product addresses the \$XX market of [identified markets]. 1-3 sentences on market path, partnership, and regulatory milestones.

PAGE REQUIREMENTS

Introduction

- The Company
- The Goal

Significance

- Problem to be solved
- Gap in knowledge
- Prelim studies

The Product

- Technological Innovation

Long Term Impact

- Rationale for the goal

Phase I Project:

- Phase I Hypothesis
- Specific Aim 1...
 - Acceptance Criteria
- Specific Aim 2...
 - Acceptance Criteria
- Expected Outcomes
 - Proof of Feasibility

Plans for Phase II

Commercial Application

ONE PAGE!

Formatting

Single Spaced

12-point Times New Roman font

4 point space between paragraphs*

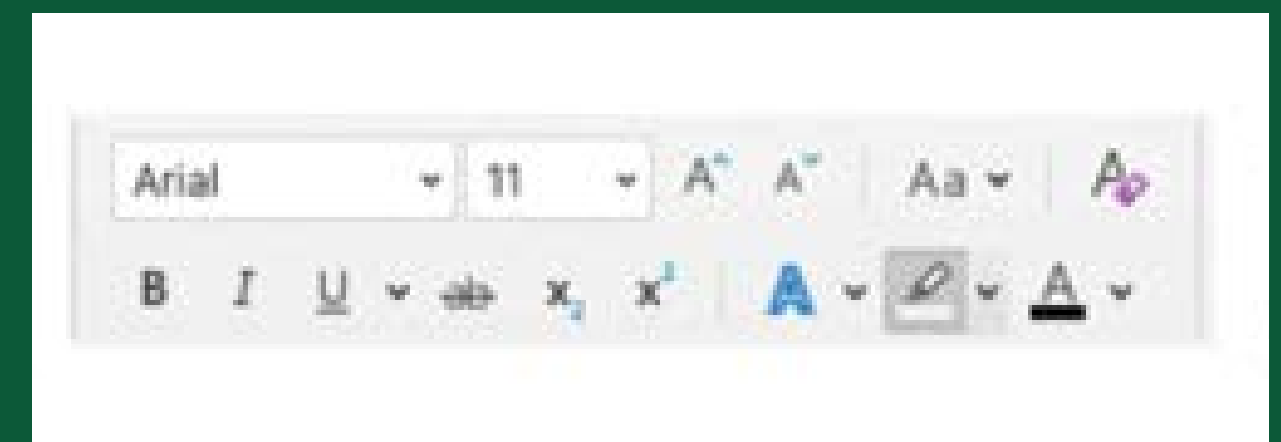
Left aligned*

0.5" margins on all sides

*our recommendations

Tips:

- Use these section headers.
- Tell a compelling story about problem, need, your solution.



Introduction

Establishes that you are a legitimate for-profit company with the skills and resources to do the research. Immediately describes the problem addressed and describes the technology that is the subject of the research.

BASICS

- State the company name and status: startup, existing, etc.
- List relevant partners and licenses.
- Briefly state focus of research.
- Include home city & state like this: “Alpaca Biosciences (Milwaukee, WI) intends to commercialize...” This provides reviewers with info as to where the company is located.

TIPS

Potentially include the tradename of the product. “Alpaca Biosciences (Milwaukee, WI), has developed PANDA, a new at-home diagnostic test for nitrates in the soil.” Introducing the tradename early on can save space later, as you can simply refer to the tradename throughout instead of repeating “the at home diagnostic test for nitrates in the soil”.

STRATEGY

Short, concise and full of information.
Every word has a purpose.

INTRODUCTION HOMEWORK

PROVIDE THE INTRODUCTION BELOW

Example:

XYZ LLC proposes developing a three-dimensional oyster cultivation raft that incorporates automated solar-powered cleaning and tumbling of the oysters.

Goal

Briefly tell the reader what the point or your work is as well as identify the issue being addressed.

BASICS

- List your goal results in a measurable way: to what extent will there be change?
- Be very specific in what task you will perform to provide a solution.
- Clearly and articulately describe the final product and where it will be used.
- Plainly describe the benefit, not just the feature.

TIPS

You can also provide additional information that emphasizes at least one advantage over current solutions, like “PANDA is a faster, cheaper alternative that allows farmers to accurately measure nitrates in their soil.”

GOAL HOMEWORK

PROVIDE GOALS BELOW

Example:

The goal of this system is to allow aquaculture operations to realize farm profitability sooner and with greater margin by increasing growing density and reducing costs per oyster.

Significance

Provide information to validate that the problem addressed is important to stakeholders and to convey the size and extent of the problem. The issue addressed should be important enough for funding when compared to other proposals. Detail the specific group helped by your solution.

BASICS

- State the type of population affected: farms, rural populations, environments, etc.
- Measurable effect on that population: number of farms, costs incurred, damage to environment, etc.
- Pull on society, provide input from experts by including a direct quote fragment from a subject matter expert stating the significance: Director of Program says this issue is “wasting time and money”.
- Costs/funds currently spent on the issue.

STRATEGY

Good language to use is “There is a critical need for better...” Emphasizing the critical need will enhance the importance of your significance.

TIPS

Small problems that are nearly addressed are less interesting than larger problems that affect a lot of people and cost a lot of money and lives.

SIGNIFICANCE HOMEWORK

PROVIDE THE SIGNIFICANCE BELOW

Example:

Producing sustainable acrylic acid and acrylates brings significant health and welfare benefits through increased sustainability to the \$11 billion 6.8 million metric ton per annum acrylics value chain used throughout the superabsorbent polymer paints coatings and adhesives markets.

Gap in knowledge

Address current solutions for the problem. Focus on providing reasons that current strategies are not 'good enough'. If you don't already know current solutions or your competition, start researching. There is ALWAYS competition, even if no one else does what your innovation does.

BASICS

- Summary of current solution including failure rate, cost, length of time to complete, etc.
- Describe the specific problem that isn't addressed by current methods, provide quantitative numbers of those affected by the failings of the current method.
- State the current flaw being addressed that your product will improve.
- Reference back to significance section to convey that the status quo is allowing significant setbacks, human suffering, etc.
- Explain what the "ideal solution" is and how your product fulfills or comes closer to that, using quantitative numbers of what the ideal solution should reach. This sets up the targeted milestones for the specific aims.

STRATEGY

Use a list of identifiers that make up the "Ideal Solution". For example, "The ideal solution would be an at-home test that allows farmers to rapidly and accurately measure nitrates in their soil." Then, use the same descriptors for your product. "PANDA is an at-home test that is both rapid and accurate."

TIPS

Even if there isn't a way to currently treat the problem at all, there is a way that people are dealing with the problem. A competing strategy could be to just 'live with the problem' or ignore it. If the current solutions are 'good enough' than it's harder to fund your project.

GAP IN KNOWLEDGE HOMEWORK

PROVIDE GAP IN KNOWLEDGE INFORMATION

Example:

For modern aquaculture to increase scale and productivity lessons from the Green Revolution including the standardization of new farming equipment and widespread use of improved cultivars should be applied to the aquaculture space. An ideal solution requires comparing seed source towards the more reliable and productive seed from year-round gametophyte cultures.

Preliminary Studies

If space allows, briefly describe what research your team has done already that shows your eventual product can be successful. Detail the specifics of the success rate of your past research and convey why this success would translate to an eventual product.

BASICS

- List partners of the university or organization involved in your research and detail why they are reputable experts.
- Emphasize the best points that have emerged from your prior research using quantifiable measurements. You will have more space later to discuss any shortcomings.
- Describe the specific and measurable endpoints that must be reached to prove feasibility.

STRATEGY

Explain how the preliminary findings lead to the requirement of more work. “While our initial work on PANDA is promising, we still need to prove efficacy and accuracy of our methodology.”

Show that this is not a ‘fishing expedition’ to find to find something that should be completed in academia, but rather selects the potential targeted components for commercial development.

TIPS

Do not claim the ‘company’ has done the preliminary studies when it was the work of the University researchers. It is more correct to say “Our collaborators at XYZ University have done this.”

PRELIM STUDIES HOMEWORK

PROVIDE PRELIMINARY STUDIES INFORMATION BELOW

Example:

Our innovation is already patented, the equation has been calibrated based on physical testing around 20 sites have been modeled, and discussions with potential end-users have occurred.

Product

This gives a sense of what your ultimate commercial product will be. Describe what the product will be and who will use and/or buy it. Describe how far along you expect to be with your Phase I research.

BASICS

- Describe your product in layman's terms as if advertising your product to high schoolers using numbers to convey the appeal of your product.
- State what you will do with the awarded money to turn your research into a product.
- Detail how established or complete your expected prototypes will be.
- Include the measurement of feasibility that will apply to your product in Phase I.
- If this is a Phase II grant, explain what will result from the Phase II work (a prototype, a miniaturized prototype, etc.).

STRATEGY

State your end user and product purchaser. Tie the purchaser back to significance because you've shown that a subject matter expert has an interest related to your product.

Explicitly set the goal of what is defined to 'prove feasibility'. You might be able to say 'In order to prove feasibility in phase I, we need to demonstrate...".

TIPS

Know who your purchasers will be, and what their purchasing power is. If your product targets farms, reason out how they will afford your solution.

PRODUCT HOMEWORK

PROVIDE PRODUCT INFORMATION BELOW

Example:

The product is a commercial soy seed treatment platform of dsRNA delivery that should be broadly applicable to induce defense against many fungi. It can be further extended to induce beneficial crop traits providing suites of environmentally sound crop protection and enhancement options for the farmer.

Long-Term Impact

Provide a sense of how your product will be used and how it ties back to the problem you've identified. Detail what the problem will look like in five or ten years with and without the solution you provide.

BASICS

- Detail what a successful version of your product looks like in use.
- Describe how it will directly reduce or solve the issue if commercialized.
- Define the subset of people who will actually be helped by the product and how their lives will improve.

STRATEGY

Address the problem that you previously stated and not a subset or a superset of that problem's symptomology. For example, if the problem that you stated was "Head Smut costs corn producers \$XB per year." Then, your solution should address Head Smut and its costs, not another corn-related disease.

LONG-TERM IMPACT HOMEWORK

PROVIDE THE LONG-TERM IMPACT BELOW

Example:

If successful, the biocomposite will dramatically improve the energy efficiency of buildings create new income streams for farmers that can support the transition of millions of commodity crop acers to climate-smart agronomic practices and create entrepreneurship opportunities in agriculturally-related manufacturing through low microfactory startup costs.

Technical Objectives

You can have 1-3 technical objectives, each about one or two sentences that summarize what you want to prove, demonstrate, or achieve. This is NOT what you want to do, or what experiments you want to carry out. These are the things you need to prove in order to convince reviewers your project is feasible.

BASICS

- Describe the things you need to prove in order to convince reviewers your project is feasible. This can be tied back to your feasibility statement.
- List your objective and measurable milestones with your short and clear technical objectives.
- Milestones should be a go/no-go criteria and are NOT tasks or methodologies, but are a goal of what needs to be proven, demonstrated or achieved, etc.
- Include a solid measurable milestone that is clear, and that can be proven to be reached or not. It is not a vague milestone that can be disputed as being achieved or not.

STRATEGY

Try NOT to make your objectives dependent on each other, such that if Objective 1 fails, then Objective 2 is impossible to complete.

TIPS

Include benefits of the potential tech into sentences with quantitative impact potential.

Work goals into the statement - "identifies 95% of pre-emergent symptomologies to allow earlier treatment of the crop."

End with a punch - "1.3M would be missed without this product I'm making".

TECHNICAL OBJECTIVE HOMEWORK

PROVIDE THE TECHNICAL OBJECTIVES BELOW

Example:

Objective 1: ABC LLC proposes a natural solution using plant derived extracts to soften the cervix enabling an artificial insemination rod to pass into or through the cervix depositing sperm close to the site of insemination. Milestone: Creation of a less expensive, easily accessible, reliable and repeatable insemination system for small ruminants that provides the same (not significantly different) pregnancy results as laparoscopic insemination.

Expected Outcomes

Another place to say that proving these aims will show feasibility, as well as set you up for what needs to be done in Phase II and beyond.

BASICS

This is a restatement of the measures of success that you will have shown. For example, “By achieving these aims, the system will allow producers to retain active gases to control atmosphere in packaging.”

Reiterates what the expectation is for the outcome.

Clear and measurable and not disputable or subjective.

EXPECTED OUTCOMES HOMEWORK

PROVIDE THE EXPECTED OUTCOMES BELOW

Example:

Successful completion of the Phase I technical objectives will reduce environmental degradation through an increased ability to accurately and quickly know whether forestry operations adhere to Forestry Best Management Practices.

Plans for Phase II

This will allow the reviewers to see what your future plans are and what you need to do after Phase I success. Provide an idea of what is to be done in Phase II. Show you are thinking ahead beyond Phase I and have a roadmap in place.

BASICS

- Detail measurable ways in which the work that you do in your Phase I will meet qualification requirements for Phase II.
- List specific Phase II requirements that you will meet.
- Remember that the USDA will not hold you to your word – this is at best an estimation of what will happen. Your Phase I work could reveal very different outcomes than what you planned for.
- If this is a Phase II grant, tell them what remaining work will need to be done after this (such as during Phase IIb, etc.).

PLANS FOR PHASE II HOMEWORK

PROVIDE THE PLANS FOR PHASE II BELOW

Example:

Subsequently, these resources would be used during a potential Phase II project to develop finished Orange Sweet Corn inbred lines and commercial hybrids.

Commercial Application

This is less important in the executive summary page if you don't have room and have mentioned the significance of the problem in terms of people and costs above.

BASICS

- May not be necessary.
- If you have space, include commercial goals (like submission to the FDA or to other regulatory bodies, the date you anticipate initial sales to begin, or additional steps needed prior to full commercialization.).
- Gives an idea of what is the final product and what needs to be done.
- Includes partnerships or other resources beyond the SBIR/STTR funding.

STRATEGY

if you have space, describe what regulatory or partners and IP you are working on or need to work on, to make your ultimate product successful.

COMMERCIAL APPLICATION HOMEWORK

PROVIDE THE COMMERCIAL APPLICATION BELOW

Example:

Once developed and adopted, NutraMaize Orange Sweet Corn has the potential to make a meaningful impact on the amount of health protecting carotenoids consumed by Americans.

Review

Get feedback from as many people as you can. Have several people review your page including CTC. Remember, this is a page that should clearly outline your plan to reviewers. After reviewers chime in and you are satisfied with your page, contact an USDA Program Manager for a meeting.



USDA PROGRAM MANAGER

Schedule a meeting with a USDA program manager to discuss Technical Objectives Approach

Proposed agenda for the USDA Program Manager meeting:

1. Problem validation: Is this within the scope of interest of the Department? What are your pieces of evidence to support the qualitative and quantifiable claims?
2. Current gaps: Discuss your knowledge gaps important for this research/product development approach. Discuss a plan for additional justification with CTC. This could include letters of support content to justify your claims.
3. Program manager conversation: Discuss strategy with an USDA Program Officer.
4. Apply for CTC micro-grant: After USDA Program officer review and favorable feedback, apply to CTC's micro-grant program to hire a grant consultant.



Give yourself an accountability deadline of a week for this section. Schedule a CTC meeting today in preparation for a meeting in 1 week.

Now What?

SBIR Assistance micro-grants are aimed at technology and research-based Wisconsin businesses who intend to apply for SBIR/STTR federal funds. The grants cover reimbursement of costs up to \$5,000.00, incurred by a business in hiring an independent, approved third-party to assist in the development of federal Phase I SBIR/STTR research and development proposal.

A man and a woman are sitting at a wooden desk in a modern office setting. The man, on the left, has a beard and is wearing a light-colored shirt. The woman, on the right, is also wearing a light-colored shirt. They are both looking at a tablet computer that is propped up on the desk. The man is pointing at the screen with his right hand, and the woman is holding a pen over an open notebook. In the background, there is a large green plant and a brick wall.

\$5,000

CHECKLIST

At the end of module two you should have to following checklist completed.

- **Feasibility**
- **Technical Objectives**
- **Draft of Executive Summary Page**

HAVE QUESTIONS?

Reach out to the CTC with questions or concerns [here](#).

FINISHED WITH SESSION TWO?

It's time to reach out and check in with your CTC consultant to discuss the overview summary.

Todd Strother



Rob Baranowski

