



Proposal Writing Workshop
27 October 2010
Charlotte, NC

Agenda

- 0900-0930** Introduction – Why Are We Here?
- Goals and Objectives
 - Understanding the Requirement
 - Compliance vs. Responsiveness
 - Example RFP
 - How to Maximize Responsiveness
 - Winning Proposals
 - Why Proposals Fail
- 0930-1100** Specific Tips for Writing Good Proposals
- Content
 - Writing Style
 - Proposal Preparer’s Kit (PPK) Overview
 - Proposal Checklist
 - Requirements Analysis
- 1100-1145** Developing a Solid Business Case
- What is a Business Case
 - Purpose of a Business Case
 - Heart of a Business Case
 - Potential Benefits Framework (Navy and Shipyards)
 - Typical Approach to Develop a Business Case
 - Introduction to Example
 - Discussion
 - Business Model
- 1145-1215** Effective Oral Communication
- 1215-1300** Lunch
- 1300-1400** Business Case Example #1 – Reduce Labor Costs
- 1400-1500** Business Case Approach Facilitated Discussion
- 1500-1515** Break
- 1515-1600** Wrap Up



Workshop Meeting Materials

National Shipbuilding Research Program

2010



Proposal Writing Workshop

27 October 2010

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Day's Agenda

Time	Topic	Facilitator
0900-0930	Introduction	Lynn Yarosh
0930-1100	Specific Tips for Writing Good Proposals	Lynn Yarosh
1100-1145	Developing a Solid Business Case	Rob McPherson
1145-1215	Effective Oral Communication	Lynn Yarosh
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Why Are We Here?

- Navy desires higher quality proposals that better project “value realization”
 - Make a better business case
- Think outside the box
- Focus on technology transfer and implementation plans

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Goals and Objectives

- Understanding of NSRP proposal content requirements
- Writing strategies
- How to build a better business case
- How to articulate Navy and Industry benefits
 - Technology Transfer/Implementation

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Understanding the Requirement

- In the case of NSRP, requirements are articulated in the Research Announcement (RA) and further detailed in the Proposal Preparation Kit (PPK)
- Use your understanding of the requirement to:
 - To drive teaming, fill gaps, enhance value
 - To expand resources and capabilities
 - To do “deep” research – “**stretch** for better solutions”
 - Explore foreign industry best practices
 - Commercial yard and company best practices
 - Centers of Excellence

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Compliance vs. Responsiveness

- Being compliant means doing exactly what the Research Announcement asks, following both the submittal instructions and meeting all requirements
- Being responsive means proposing a solution that meets Navy/Industry underlying needs and solves a problem

Project proposals should be compliant AND responsive!

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Example RFP

- To maintain a positive public image, Bubba's Bar-B-Q needs the grass around their restaurant maintained at an acceptable height. So Bubba's issues a request for proposals, looking for the best value, specifying weekly grass cutting by push mower for 1 year.

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Proposal 1

- **Bidder A** offers to cut the grass weekly with a push mower for 52 weeks, even though the grass might be dormant in snowy winter or dry summer months.

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Proposal 2

- **Bidder B** offers to use a push mower, but to cut the grass only as needed. B offers to mow more often than weekly in the spring when grass grows rapidly, but eliminate mowing when the grass is dormant, thus reducing the total lawn cutting cost.

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Proposal 3

- **Bidder C** offers to use a robot mowing system that senses grass height and cuts as necessary, thus keeping the lawn at the desired level but reducing the mowing frequency and perhaps the total cost.

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Analysis

- **Bidder A** is offering a compliant, non-responsive solution.
- **Bidder B** is compliant with the method, noncompliant on the cutting interval, but responsive to the underlying appearance need.
- **Bidder C** is noncompliant on the method, but responsive to appearance needs.
 - However, is there some reason for Bubba's "push mower" requirement? Does Bubba want to promote full employment? By "push mower," did Bubba's mean a manually powered push mower aligned with a desired "green, low-carbon-footprint" public image?

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Being Responsive to NSRP

- Ensure proposals comprehensively meet evaluation criteria
 - Strategic fit and leverage
 - Business case, including project metrics
 - Innovation and technical merit
 - Technology transfer and industry implementation
 - Team strength and management plan

**Compliant and Responsive
Proposals Win!!**

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Being Responsive to NSRP (cont.)

- Use a strategic approach to research project development
 - Focus on NSRP priorities
 - Improve Quality (reduce rework)
 - Reducing Total Ownership Costs (TOC) cradle to grave
 - Energy Efficiency (reduce operational needs and energy used in production/operation of the ship)
 - Target Strategic Investment Plan Focus Areas
 - Promotion of Modular Construction
 - Reduction of Re-work
 - Improving Production Engineering
 - Improving Specifications and Standards
 - Improving Manufacturing Processes
 - Improving Production Planning
 - Interoperability and Data Exchange
 - Improving Safety & Health / Reducing Environmental Impacts
 - Education and Training
 - Total Ownership Cost

**Strive for better ideas –
better solutions!**

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How to Maximize Responsiveness

In general:

- Proposals should acknowledge the big NSRP picture – what are we trying to accomplish?
- What stands in our way? How can we overcome?
- Emphasize how your products or services or ideas will help.
- Ensure benefit/value is underscored!

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A Winning Proposal...

- Complies with the solicitation requirements
 - Explicitly answers all of the customer's questions
- Stands on its own
 - It is factual, benefit oriented, and takes nothing for granted
- Is strategy driven
- Builds quality in – does not edit it in
 - Work is front-loaded with continuous improvement through incremental reviews
- Emphasizes up-front program and management planning
 - Detail in plans substantiate credibility of proposed cost
- Managed to maintain schedule and tracked by extensive metrics

Articulate the solution – if outcome is clear, benefit is clear!



Why Proposals Fail...

- Classical attributes of failure
 - Noncompliant to RFP
 - Inconsistent from volume to volume
 - Unsubstantiated claims
 - Difficult to evaluate
 - Failed to give customer what was wanted
- Typical causes of failure
 - Insufficient up-front planning
 - Lack of focused win strategy
 - Poor team communications
 - Failure to adjust to changes in acquisition environment

Ultimately, awards have to be value-based.



Why Proposals Fail - Examples

Strategic Fit & Leverage

- Lack of multiple yard participation
- Applicability to other yards not clear (single yard project – w/o adequate justification)

Business Case/Return on Investment

- Cost benefits not quantified or included
- Implementation costs not included in business case
- Lack of project metrics

Innovation and Technical Merit

- No outreach for world-class best practices
- Innovation factor is not clear or not great enough
- No proof of concept to lend credibility to technical approach

Technology Transfer and Industry Implementation

- No evidence of industry commitment to implementation
- Implementation will be too costly
- Technology Transfer events have not been included

Team Strength and Management Plan

- Low shipyard participation
- Participant roles/responsibilities not clear; task descriptions not clear
- Project plan/statement of work not adequate for project complexity

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Content

- Best practices for developing proposal (any proposal) content:
 - Express strengths through Features, Benefits, and Proofs (past performance)
 - Why are these features important?
 - How are they unique?
 - How will they benefit the Navy?
 - Performance, cost, and/or schedule improvements?
 - Proof – list objective evidence that you can provide the benefit (i.e. provide example or reference how this Feature has been applied previously and a quantitative measure of benefits realized)

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Writing Proposal Text

- The content for every paragraph/section is defined in the RA/PPK – use it as a template
 - Limit content to requirements of RA/PPK
 - Don't allow paragraphs to become too long; 3-5 sentences
 - Provide transitions between paragraphs
- Go back and read through the checklist – is it all there?
 - Remind yourself what you planned to cover
- Keep sentences short
 - No longer than 25 words
 - Using big words and a lot of them conveys the image that you don't know what you mean
 - Often it is a valid perception!!

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Writing Style

- Develop a relationship with the reader through your writing style
 - Establishes perception of credibility and confidence – a team they want to work with
 - Creates environment of compatibility or arrogance
 - If it is a “friendly read” and easy to score, the evaluator will often become an ally and look for ways to help you win – **Don't be Too Technical!**
 - For complex processes, present in steps that are easy to follow
 - Describe process for analysis – no complex calculations
- Techniques to convey a positive writing style
 - Emphasize the present tense
 - Don't be afraid of the first person
 - Be positive
 - Avoid stilted phrases
 - Use the active voice

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Writing style can bias the evaluators For or Against you!

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PPK Overview

- Users familiar with the PPK understand that it is a comprehensive set of instructions for preparing compliant and responsive proposals
- The PPK requirements have been dissected for the purposes of this workshop to help proposal writers improve the quality of their proposals
- The PPK Checklist has been amplified to not only ensure all content requirements are met but that proposals are of high quality and credibility

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PPK Checklist

- Use the PPK Checklist to ensure proposals are completely compliant and responsive and contain:
 - Your response/solution to the solicitation/RA
 - Your approach to the stated and perceived relevant issue
 - The benefits of your approach to the Navy and Industry
 - The discriminators you bring
- Your draft is ready for review when:
 - The message and supporting facts are defined for every paragraph required
 - All figures and tables are complete and each conveys a clear message
 - The reader gains a sense of the overall “story”

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Winning Proposal Wrap-Up

- Value proposition: Why the customer should choose your proposal over others
 - Only effective when tailored and focused on Navy and Industry needs
 - And when coordinated among all industry members and industry leadership - must have corporate buy-in!
- Message should be organized around three components
 - **Problem:** Identify the business problem
 - **Solution:** Identify solution or service
 - **Benefits:** Make the **Business Case** and define benefits

Experience alone does not constitute value!

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Sanity Check

- Will the evaluators be able to answer these six questions?
 - What are you offering?
 - How is this solution better?
 - Why is the solution better?
 - How are you going to do it?
 - How much it will cost?
 - Is the recommended approach credible?
 - Is it *realistic*?

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Requirements Analysis

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4.5 Executive Summary

In addition to the questions posed in the PPK, include the following items:

4.5.1 PROBLEM TO BE ADDRESSED/GENERAL OBJECTIVES (WHAT)

Answer These Questions:

1. **WHAT** is the problem or deficiency?
2. **WHO** is encountering the problem or deficiency?
3. **WHERE** is the problem taking place?
4. Is it an industry-wide problem?

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4.5 Executive Summary

In addition to the questions posed in the PPK, include the following items:

4.5.2 **BUSINESS CASE SYNOPSIS (WHY)**

Answer These Questions:

1. WHAT is the business objective?
2. WHAT are the potential benefits? (Can usually be expressed in terms of Cost, Schedule , Performance and usually affects Labor, Material, or Overhead
3. WHY should we care?

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4.5 Executive Summary

In addition to the questions posed in the PPK, include the following items:

4.5.3 **IMPLEMENTATION AND TECHNOLOGY TRANSFER PLANS (COMMITMENT TO IMPLEMENT AND WILLINGNESS TO SHARE)**

Answer These Questions:

1. HOW are you going to implement the change?
2. HOW are you going to share the change?
3. WHO are you going to share it with?
4. How are they going to implement and on what contracts/platforms? Do we have the ability to do the technology transfer?

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4.5 Executive Summary

In addition to the questions posed in the PPK, include the following items:

4.5.4 OUTLINE OF TECHNICAL STRATEGY AND KEY INNOVATIONS (HOW)

Answer These Questions:

1. WHAT is your methodology?
2. HOW will you perform that methodology?
3. HOW will you know you're doing well?
4. Have you articulated key features of your technical approach?

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4.5 Executive Summary

In addition to the questions posed in the PPK, include the following items:

4.5.5 PARTICIPANTS (CONFIRMED OR ANTICIPATED) (WHO)

Answer These Questions:

1. WHO are the stakeholders?
2. WHO are your teammates?
3. WHO are the designers/implementers of the change?
4. WHO are the end users?
5. WHO are the benefactors?

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4.5.3 Implementation and Technology Transfer

This section describes the business opportunity that your project will address. Include likely products, target market, potential customers (e.g., specific Navy platforms), size of market opportunity, avenues for broad diffusion of benefits, and rationale for your choices.

Remember to Link to What Is In Your Proposal:

Section 4.9 Implementation & Technology Transfer
Section 4.6.2 (3) - “new and creative” solution

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4.6 Technical Approach

“Provide sufficient technical detail and analysis to support the technical approach being proposed. Clearly identify the core of the intended approach. It is not effective to simply address a variety of possible solutions to the technology problems.”

***Find the Pain,
Offer the Solution***

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4.6.1 Background/Scope/ Project Objectives

Provide the following information:

- Background and Proposer's understanding of the problem and/or technology/process deficiency...

Answer These Questions:

1. WHAT is the problem or deficiency? WHAT is the origin of the problem? WHAT was the problem this original issue was attempting to solve?
2. WHO is encountering the problem or deficiency?
3. WHERE is the problem taking place?
4. Is this an industry-wide problem?

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4.6.1 Background/Scope/ Project Objectives

Provide the following information:

- Scope, including summary of technical/process issues being addressed...

Answer These Questions:

1. WHAT is the specific problem?
2. WHERE is the problem taking place?
3. HOW does it affect operations?

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4.6.1 Background/Scope/ Project Objectives

Provide the following information:

- Project Objectives that include:
 - Vision of what will be achieved
 - Solutions the effort will produce
 - Benefit metrics

Answer These Questions:

- 1.WHAT is the end state that you propose to accomplish?
- 2.WHAT Benefit(s) to Navy and Industry will result?
- 3.WHAT will you measure to ensure these benefits are taking place?
- 4.HOW will you measure? How often will you measure?

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4.6.2 Technical Discussion

Provide the following information:

1. Essence of Intended Approach

Answer These Questions:

- 1.WHAT is your Concept of Operations?
 - High-Level description of the Approach as it fits into the global process
 - Addresses the WHO, WHAT , WHEN, WHERE, WHY and HOW for the approach in general terms. Note: This is a description of the approach and not a discussion of the problem.
 - Make concise

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4.6.2 Technical Discussion

Provide the following information:

2. Technical detail and analysis to support approach being proposed.

Answer These Questions:

1. What formal methodologies will you employ?
2. What documented processes/procedures will you follow?
3. Will you perform any process re-engineering?
4. Will you perform any reverse engineering?
5. Will you use any design aids?
6. Will you use any documentation aids/techniques?
7. How will you use any job aids?
8. How will you maintain process documentation?
9. How will you maintain configuration management?
10. Are there MIL SPECS or STDs that governs this process?

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4.6.2 Technical Discussion

Provide the following information:

3. If proposing "new and creative" solution, develop and analyze in this section.

Answer These Questions:

1. Why is there a need to be innovative?
2. How will you achieve an innovative solution?
3. How will new ideas be qualified?
4. How will new ideas be researched and/or pursued?
5. What criteria will be used to determine whether to implement an innovation?
6. How will innovation be tracked and reported?
7. Are there any ownership/intellectual property issues regarding innovations? (Have data rights been adequately addressed)?
8. Have you identified who the Technical Warrant Holder is and solicited his/her participation?

Specific individuals who have been delegated the Navy's technical authority in specific technical areas and have support from key personnel at NAVSEA, the warfare centers, and other activities (technical authority pyramids)

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4.6.2 Technical Discussion

Provide the following information:

4. Key technical, schedule, and cost risks, their potential impact and mitigation.

Answer These Questions:

1. WHAT are your key risks?
2. HOW will you mitigate risks?
3. Will any risks be shared between you and the customer?
4. HOW will you monitor your risk management performance?
5. What are your contingency plans for risk-related problems?

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4.6.3 State-of-the-Practice

Each proposal must include a discussion of what technology is currently available in the proposed area. Discussions should include:

- Results of/evidence of the current state of the art/literature searches and how your approach compares to other possible approaches.
- Current limitations of the general technology area / process being addressed
- Connections to ongoing or past projects in the general technology area / process being addressed
- From what technical baseline will your project begin (including work you have already done)? Given that baseline, what additional technical challenges need to be addressed to achieve your technical objectives?
- What organizations or individuals (other than yourselves) are doing the most advanced work in your proposed area of research? By comparison, why are you likely to succeed?
- Identification of government funding (to include but not be limited to SBIR and ManTech) for a current effort(s) or one being proposed within the next 12 months that is similar to the work being proposed

Answer These Questions:

1. WHAT is being done today (Link to the Background in 4.6.1)?
2. WHAT does this technology bring to the current problem?
3. HOW will you implement these technologies?
4. Is there a SBIR or Mantech project linked to the proposed project?

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4.6.4 People and Organizational Impacts

Describe the project's approach to addressing people and organizational impacts, including how, in the context of performing this project:

- organizational change/cultural change will be accommodated

Answer These Questions:

1. How does this project fit into the corporate organization?
2. How will you organize this project?
3. What are the major features and benefits that will result from this organization?
4. What roles and responsibilities will people have?
5. How will accountability be achieved?
6. Where are the lines of communication?
7. What is the escalation path for unresolved issues?
8. How easy to incorporate into your own company (will education/training be required? Are there corporate roadblocks, unions, barriers, cultural obstacles)

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4.6.4 People and Organizational Impacts

Describe the project's approach to addressing people and organizational impacts, including how, in the context of performing this project:

- current human resource functions will be impacted
- education/training will be addressed

Answer These Questions:

1. How important is the staffing to the overall success of the project?
2. Who are the key personnel? What is their subject matter expertise?
3. What level of effort will they contribute?
4. How will you recruit new personnel if needed?
5. How will new project staff be oriented/trained?
6. What on-going training/skills enhancement will need to be provided?
7. Are skill sets matched to project requirements?

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4.8 Risk Management

“The offeror must identify and discuss the risks to the successful completion of the proposed project. Risk factors may be those inherent in the work or unique to the offeror's chosen approach. While not a complete list, general areas of possible risk that are of concern are technical, schedule, cost, safety, security (including personnel, information technology), implementation and environmental risks. The offeror's discussion of a risk factor should provide the offeror's approach to managing the risk--the probability of the risk, impact and severity, time frame and risk acceptance or mitigation.”

Answer These Questions:

1. What are the key risks?
2. Is getting it to work a risk?
3. Is technology maturity a risk?
4. Is measuring the benefit a risk?
5. Is technology transfer a key risk?

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Risk Assessment

- The risk assessment must describe the risks of implementation and examine what happens if the project fails to bring about anticipated benefits
- The risk assessment must convey two messages:
 - That risks identified with the project can be mitigated effectively
 - That the risks of doing nothing, far outweigh the risks of implementation

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Risk Assessment (cont.)

- The risk assessment should address the following:
 - What are the risks to the organization if they spend the money and it fails? What if only some portions fail?
 - What is the financial impact?
 - What is the performance impact?
 - What is the risk if implementation takes longer than planned?
 - How can risk be removed? How can we reduce the probability the risk will occur?
 - If there is any chance that the risk will occur, what response will lesson the impact?

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4.9 Implementation & Technology Transfer

“Specific plans for implementation within the proposing shipyards, including concrete evidence of senior management support. An explanation of how the project’s approach to addressing people and organizational impacts will be incorporated within the planned implementation.”

Answer These Questions:

1. What is the project’s schedule and major milestones for completion?
4. How long will it take to complete?
5. Have you adequately addressed all schedule constraints? (have you addressed change management?)
6. What do you consider key success factors and how do your plans address them?
7. Do the project plans account for all desired outcomes?
8. What types of reports will be produced and how frequently?
9. How do you plan to transition from completion to multi-yard implementation?
13. What compliance issues must be factored into planning?

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4.9 Implementation & Technology Transfer

Offerors must also provide an approach for technology transfer beyond the project team. This approach should include:

- Technology Transfer Outline
- Deliverable Distribution
- Technology Transfer Activities
- Training Materials
- Proprietary Material

Identify the types of activities and target audience that will be performed, the technology transfer products that will be produced, such as:

- Publishable technical reports
- Manuals and technical guidelines
- Creation, population, and maintenance of website information
- Journal papers
- Symposium/conference proceedings and presentations
- Guest lectures at universities
- Mil SPECS/STDs
- Software Test Plans

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4.9 Implementation & Technology Transfer

- Workshops at the end of project phases
- Briefings, mini-symposia, and/or workshops for NSRP ASE Panels
- Other presentations to industry and/or student groups
- Education and training courses and associated course material in a variety of formats
- Video seminars, training, and demos
- On site demonstrations
- Coaching, informal consulting
- Site visits

• Identify the metrics (quantitative to the maximum practical extent) that will be used to measure the success/value of the technology transfer activities conducted during and/or after the project period of performance, and indicate when those metrics will be evaluated and published.

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4.10 Project Management

Management and Technical Team: This section should address the qualifications, capabilities, and experience of the proposed management team and technical personnel who will be assigned to carry out the project....

Answer These Questions:

1. What are the roles and responsibilities of each member of the management team? Is their background suitable?
2. How does this team distinguish your team and benefit the customer?

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4.10 Project Management

Management and Technical Team: ...Describe the past performance (most recent 5 years) of the company or team members in carrying out similar kinds of efforts, including technology application, along with capabilities and relevant experience, previous or current relevant IR&D work, and related contracts completed or in progress...

Answer These Questions:

1. What successes have you had on similar projects?
2. Are the technologies, tools, products, and methodologies to be employed familiar to your team?
3. Can you demonstrate your ability to manage a project of the size and scope?
4. What is your familiarity/history with this issue?

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What is a Business Case?

A business case articulates the financial and non-financial rationale for proceeding or not with a project.

- A tool that helps business leaders make investment decisions by articulating the impact, both financial and non-financial, of an investment
- A key question that business cases attempt to answer is “what are the likely consequences if we make a particular decision?”
- A business case is not:
 - A budget
 - An accounting or financial report
 - An overall case for change (although it provides support for it)
 - An estimate

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Purpose of a Business Case

Business cases highlight the initiatives that create the greatest value, support decision- making, and help track project performance.

- ❖ Shows how a proposed investment will create, or could create, value
- ❖ Includes both quantitative and qualitative rationale
- ❖ Supports business decisions by weighing choices or options
- ❖ Creates a way to track performance and measure success after a decision has been made
- ❖ Gains alignment and management consensus for a project
- ❖ Give enough data to implement something


Purposes of the Business Case

Understand value
 Support decisions
 Track performance

➔

The business case wraps this up into a unified "story" to help guide management decision making.

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Heart of a Business Case

The heart of a solid NSRP business case is the estimate of potential benefits that would/could accrue to the government and the shipbuilding industry if the proposed project was approved.

We recognize that in R&D projects this is not always very clear...

- In many cases the idea/technology is not proven so "potential benefits" is a more appropriate term
- Potential benefits can, however, still be estimated using the frameworks we will cover
- In many cases an outcome of an R&D project will be to further refine estimates (improve the confidence level) of the potential benefits

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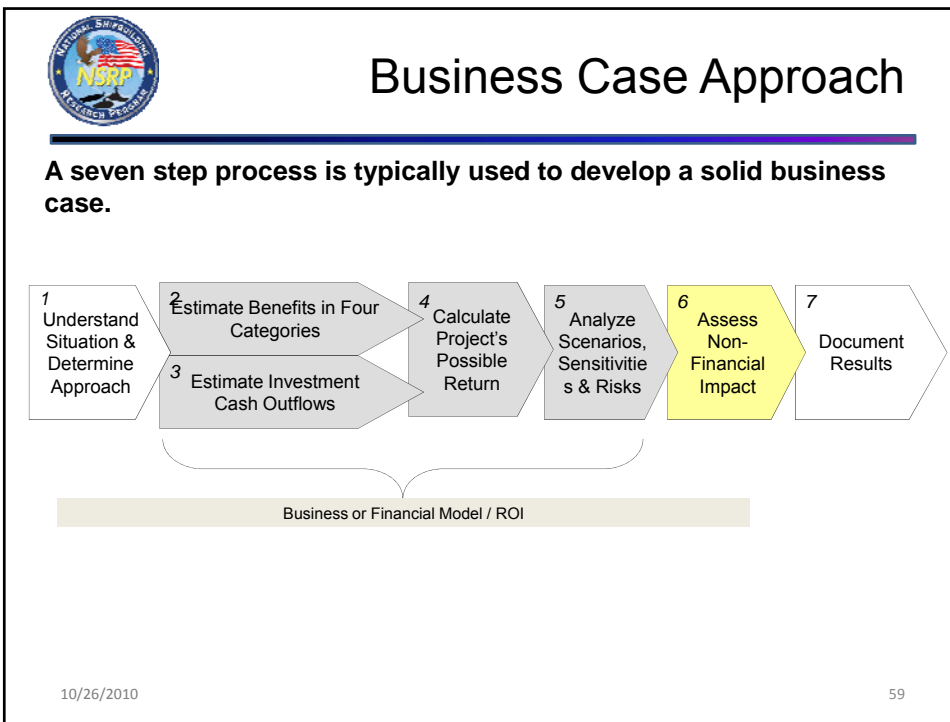
Potential Benefits Framework (Navy Perspective)

Category	Description	Examples
Cost Savings	<i>Actual reduction</i> in the number of dollars needed to design, build and/or support a ship. Dollars can be removed from a Navy Budget Line Item (BLI) as a result.	<ul style="list-style-type: none"> Reduction in design or construction hours that would be passed onto the government Reduction in CFE costs that would be passed onto the government Reduction in overhead costs that would be passed onto the government
Cost Avoidances	Reduction in the number of dollars needed to design, build, and/or support a ship but dollars cannot be removed from a Navy BLI because they have been previously removed or do not exist in the budget. Cost avoidances can also result from process improvements that prevent a future or unbudgeted cost.	<ul style="list-style-type: none"> Introduction of a new computer-aided design technology that could reduce design labor when the Navy has underestimated design labor Introduction of a new tank coating method that could reduce long-term support costs when costs of tank maintenance are not currently in any budgets
Other	Other desirable benefits that would not affect any Navy BLI now or in the future	<ul style="list-style-type: none"> Quality improvements related to reducing risks (when the costs of such risks are not budgeted) More skilled workforce



Potential Benefits Framework (Shipyard Perspective)

Category	Description	Examples
Increased Profits (FFP)	Improved gross and net profit on existing and/or future FFP ship contracts	<ul style="list-style-type: none"> Decreased direct labor costs through process improvements Decreased CFE costs through cross-shipyard strategic sourcing Reduction in overheads by outsourcing a common function
Increased Award Fees (CPFF)	Improvements to whatever parameters are necessary to earn higher award fees on existing CPFF and/or future contracts	<ul style="list-style-type: none"> Improved schedule performance Improved system/ship testing performance Improvements in other factors as specified in award fee rules
Improved Competitiveness	Improved ability for a shipyard to compete and win for both government and commercial contracts	<ul style="list-style-type: none"> Improved win rates Lower business development costs Increased revenue growth and profits Increased market share and company value
Other	Other desirable benefits that might not directly affect current or future revenues or profits	<ul style="list-style-type: none"> Improved employee satisfaction Improved safety; fewer lost hours and/or workers compensation claims Improved ability to complete for skilled workers



Step 1: Determine Approach

Determining the approach to the business case is the most important and difficult step in the process. Key elements to consider:

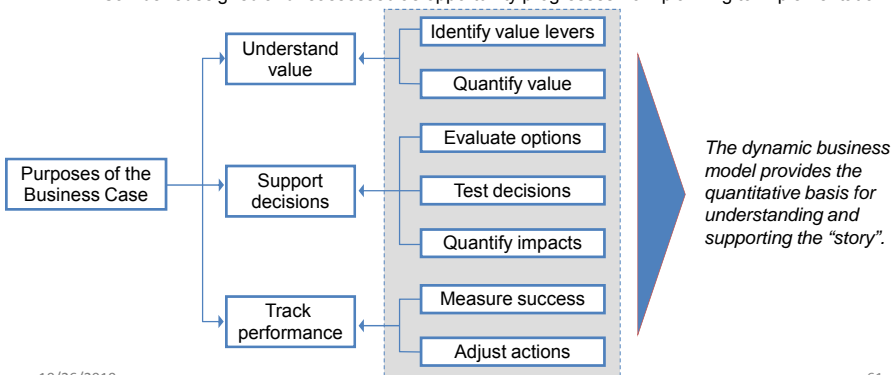
Element	Sub-factors
Timing	<ul style="list-style-type: none"> • How long it will take to complete the project • Timing of the investment • When the benefits will start to accrue • How long the benefits will continue
Processes/Functions Affected	<ul style="list-style-type: none"> • Specific processes or functions at a shipyard that would be affected • How the changes would affect labor, material and/or overhead
Shipyards Affected	<ul style="list-style-type: none"> • Which shipyards could/would take-up the new technology, process, organization, or other changes • How long it would take to transition the affected shipyards to transition to the new way of doing business
Navy Programs Affected	<ul style="list-style-type: none"> • Specific Navy ship programs that would see the benefits • When the Programs would accrue the benefits given their current position in the lifecycle (design, construction, support)/what mods
Types of Benefits	<ul style="list-style-type: none"> • Real cost savings that would/could accrue to both Navy and the shipyards • Types of cost avoidance that would/could accrue • Specific types of other benefits



Business Model

Business models (in Excel) provide the quantitative backbone upon which strong business cases are built.

- ❖ Serves as the financial “engine room” for the business case
- ❖ Provides visibility into the value mechanics of a particular business decision
- ❖ Allows for deeper understanding of financial impact of varying decisions
- ❖ Can be redesigned and reassessed as opportunity progresses from planning to implementation



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Day's Agenda

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Oral Presentations

- Making a good oral presentation is an art that involves attention to the needs of your audience, careful planning, and attention to delivery.
- The following slides present some basics to consider while preparing for oral presentations

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Effective Communication Techniques

- **Effective Communication Techniques: Listening**
Listen to you audience. This sends the message that you are receiving their feedback and grasping their points which the audience finds positive.
- **Effective Communication Techniques: Take Criticism Positively**
If someone comes to you with criticism, its just natural human response to defend your position. Try to take criticism positively and constructively. Try to empathize with the person and engage calmly.
- **Effective Communication Techniques: Avoid Arguments**
Most often than not, whenever you are trying to have a healthy conversation, it turns into an argument. Arguing does nothing, but wastes your time. Try to avoid getting into such situations. And even if you get into such situations, instead of winning the argument, find an amicable solution in a constructive way.
- **Effective Communication Techniques: Feedback**
The success of any project is dependent on how well you take feedback. Only through feedback will you know what your customers' expectations are, what you should do and what you shouldn't do.

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Positive Customer Interaction

- Leading consumer-oriented companies see every customer interaction as an opportunity to retain a valued customer, increase revenue, build loyalty or strengthen a brand.
- Ensure positive customer interaction by:
 - being truthful;
 - executing as promised;
 - keeping stakeholders informed; and
 - focusing on quality management.
- Use customer interaction effectively to:
 - Understand funding
 - Understand preferences/unstated needs
 - Understand opportunities
 - Test solution sets and teaming sets.

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The Audience

- It is important to consider how much the evaluators knows about the proposal and what else you want them to know at the end of the oral presentation.
 - Can you further elaborate on expected benefits?
 - Can you provide additional risk mitigation?
 - What distinguishes your project?
- Remember that what you want to say about your research project may be much less important than what your audience wants to hear about it.

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Planning Your Oral Presentation

- In an effective presentation, the content and structure are adjusted to the medium of speech. When listening, we cannot go back over a difficult point to understand it or easily absorb long arguments. A presentation can easily be ruined if the content is too difficult for the audience to follow or if the structure is too complicated.
- As a general rule, expect to cover much less content than you would in a written report. Make difficult points easier to understand by preparing the listener for them, using plenty of examples and going back over them later. Leave time for questions within the presentation.
- Give your presentation a simple and logical structure. Include an introduction in which you outline the key points/themes from your research project you intend to cover and a conclusion in which you go over the main points of your talk.

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Delivering Your Presentation

- The main points to pay attention to in delivery are the quality of your voice, your rapport with the audience, use of notes and use of visual aids.
- Voice quality involves attention to volume, speed and fluency, clarity and pronunciation. The quality of your voice in a presentation will improve dramatically if you are able to practice beforehand in a room similar to the one you will be presenting in.
- Rapport with the audience involves attention to eye contact, sensitivity to how the audience is responding to your talk and what you look like from the point of view of the audience.

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Visual Aids

- Visual aids (PPK allows 4 different visual aids) should help make the presentation more lively. They should be developed to help the audience to follow your presentation and help you to present information that would be difficult to follow through speech alone.
- In accordance with PPK only hard copy presentation materials can be used. These should be objects that can be displayed or passed around the audience. Printed handouts can be presented to the audience for more complicated oral presentations, or they can be presented at the end of the talk if other visual aids (e.g. story board) is being used.

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Introduction to Example

For the remainder of this learning module, we will build an enhanced business case for a proposed NSRP project, using the seven-step methodology.

Proposed Project (fictitious):

- Development of laser welding technology that could improve tank construction process efficiency and reduce re-work
- Potential for real cost savings and cost avoidance on multiple Navy programs
- \$2.4M investment
- One year to develop and test the technology

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Approach Considerations

Element	Sub-factors	Assumptions
Timing	<ul style="list-style-type: none"> How long it will take to complete the project Timing of the investment How long it would take affected shipyards to transition to the new way of doing business When the benefits will start to accrue How long the benefits will continue 	<ul style="list-style-type: none"> One year Straight-line spend over the year One year after completion, allowing time for technology transfer to shipyards and to work in process changes Immediately on all ships in metal-fab construction phase 30 years
Processes/ Functions Affected	<ul style="list-style-type: none"> Specific processes or functions at a shipyards that would be affected How the changes would affect labor, material and/or overhead 	<ul style="list-style-type: none"> Tank welding for all in-house constructed tanks Reduction in direct labor hours to weld each tank and reduction in testing hours due to improved quality. Also reduction in material scrap rate
Shipyards Affected	<ul style="list-style-type: none"> Which shipyards could/would take-up the new technology, process, organization, or other changes 	<ul style="list-style-type: none"> All over time, phasing in over a 3 year period
Navy Programs Affected	<ul style="list-style-type: none"> Specific Navy ship programs that would see the benefits When the Programs would accrue the benefits given their current position in the lifecycle (design, construction, support) 	<ul style="list-style-type: none"> All major combatants and support ships per the business model Per the current 30 year shipbuilding plan and the ships already under contract across the industry (and types of contracts)
Types of Benefits	<ul style="list-style-type: none"> Real cost savings that would/could accrue to both Navy and the shipyards Types of cost avoidance that would/could accrue Specific types of other benefits 	<ul style="list-style-type: none"> Direct labor cost savings and material savings from reduced scrap rates No other soft benefits identified, but there could be some

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Business Model

HAND OUT

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Other Examples:

For our discussion period we will develop approaches for the following hypothetical NSRP projects:

Project 2	Project 3
Development of new paint for tanks that lasts 3 times as long as current paint, requires only one coat (versus 2), but costs 2.5x as much. Applicable to all Navy ship classes and all tank types (distilled water, gray/black water, all types of oil, other)	Introduction of new financial management system that can reduce the time to process purchases of material and labor by 5x, improve government invoice accuracy by 60%, and improve days required to bill by 50%.

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BACK UP

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Good Proposal Practices

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Graphics

- Art is an effectual means of presenting data
- “Write the art”; do not “illustrate the text”
- Convey a clear message
 - Focus on ONE idea
 - Convey this idea sharply and purposefully
 - Be specific
- Highlight the BENEFITS in the graphic and the action caption

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Graphics (cont.)

- Review the Action Caption
 - Is enough information provided to help evaluator understand the central points?
 - Is the Action Caption a Full Sentence?
 - No Horse Charts! (i.e. picture of horse with the caption “Horse”)
 - Longer than simple titles (e.g. Milestone Chart, Trade Study)
 - Keep it brief (two-line maximum)
 - Ensure Benefits are adequately highlighted

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Guidelines for Effective Graphics

- Use graphics to amplify, not duplicate, text
- Avoid cartoon-type illustrations
 - Use detailed or fully representative drawings, photographs, or actual data
- Avoid “twists”
 - Turning document sideways to read a graphic is irritating to the reader and it may be skipped over
- Don’t ask the visual to serve more than one purpose
 - Stick to the central

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The Focus Box is a Special Type of Graphic

- Upper right corner of the page
- Summarizes major ideas and concepts of section
- Not referenced in text
- Bulleted format

Our work control system and commitment to total quality produced an enviable 5-year record

- 99.9% on-time contract deliveries
- Work control system data integrity greater than 99%
- Inventory accuracy better than 99%
- Real-time status
- 100% satisfactory customer evaluations of control systems.
- 100% satisfactory Air Force Contractor Operations Review

Quantification is Essential!

Bold Assertion

Bullets Prove Claim

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Design a Thesis Statement

- A one sentence lead-in (no more than 35 words) to summarize:
 - Our approach to meet the requirement
 - The customer benefits
- Permits selective skimming of proposal
- Thesis statements convey discriminating information
 - Preferably are quantitative statements
 - Highlight customer benefits
 - Ideally, are untrue for our competitors



Thesis Statements, Focus Boxes, and Action Captions

- The thesis statement, focus box, and figure action caption should all be present on the first page of Executive Summary
 - Thesis statement responds directly to proposal instructions
 - Focus box claim makes a marketing statement highlighting a discriminating feature of our offer substantiated by the bullets
 - Action caption encapsulates the message of the figure, which is supportive of the thesis statement

The screenshot shows a portion of a proposal executive summary. Three yellow callout boxes point to specific elements:

- Thesis Statement:** Points to a blue box containing a one-sentence lead-in summarizing the proposal's approach and customer benefits.
- Focus Box Claim:** Points to a blue box containing a marketing statement highlighting a discriminating feature of the offer, supported by several bullet points.
- Action Caption:** Points to a figure caption below a diagram, which encapsulates the message of the figure in a way supportive of the thesis statement.



Planning Text

- Use bullets to define the points to be made in each paragraph
 - Derive the messages and key points from the Executive Summary
 - Define the supporting data (facts that substantiate the assertions)
- For the first iteration, develop the central message statement for each paragraph
 - Start allocating your real estate into paragraphs by placing the statement in its approximate location on the page
 - You should wind up with a lot of open space for the final text
- As the draft evolves, expand the paragraph definition using briefing chart-like statements to capture the key points
 - Objectives, logic, crucial data, important conclusions
 - Facts, facts, facts, ...
- Incorporate introductions to the figures

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Figure Introductions

- Proposal graphics (figures) that suddenly appear without introduction or explanation generally confuse readers
- Text should direct the reader to the figure, summarize the information presented, and highlight the conclusions that the reader should draw
- Examples:
 - **Poor:** “Total cost of this project is estimated to be \$356,000 (Figure 2-15).”
 - **Better:** “Total cost of this project is estimated to be \$356,000. Figure 2-15 provides a detailed accounting of the cost breakdown.”
 - **Best:** “This project is estimated to be \$356,000. The cost breakdown in Figure 2-15 shows that the hardware costs account for nearly 65 percent of the total costs, while labor costs constitute only 12 percent of the total.”

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Conveying a Clear Message

The PDW plans how you will make life easier on the evaluator by using :

- **Thesis Statements** to encapsulate your response to the primary Research Announcement (RA) instruction and the benefits
- **Focus Boxes** to highlight discriminators and benefits
- **Graphics** to convey key points and supporting data
 - **Action Captions** to feature the main message of figures and benefits
- **Subheadings** with key words from the RA to act as roadmaps to the responses to RA requirements
- **Facts** to substantiate your main points

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Emphasize Present Tense

- Lends air of credibility and confidence
- Gives impression that we are proposing something real rather than mere good intentions
- Only exception is when it is important to make a distinction between past, present, and future

Poor: The Program Manager will publish a weekly status report for contractor visibility.

Better: The Program Manager publishes a weekly status report for contractor visibility.

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Use the First Person

- Stronger, more vigorous, more emphatic
- Use “we” and “our” instead of “the ABC Company” and “the XYX Team”
- Remember, customer is looking for a contractor, not a disembodied entity

1. Launch of the first satellite will occur in month 26.	<i>We launch the first satellite in month 26.</i>
2. Joe Leader has been appointed program manager.	<i>Our program manager is Joe Leader.</i>

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Be Positive

- Positive Statements
 - Show confidence
 - Carry more conviction
 - Are usually shorter
- Negative statements often sound evasive
- Avoid caveats and conditional statements unless they really are absolutely necessary

Positive: We maintain at least 50% fuel level.

Passive: We never allow the fuel level to be less than 50% of capacity

Positive: Our training program

Conditional: Our proposed training program

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Avoid STILTED Phrases

- Demonstrate understanding with statements of substance
- Avoid phrases such as
 - “Our Company understands ...”
 - “It is understood ...”
 - “We understand ...”
- These stilted phrases become unsubstantiated claims and actually convey the opposite impression – that you don’t!

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Use the Active Voice

- Simpler
- More direct and believable
- More forceful and self-confident
- Usually less wordy

Active Voice:

When the structure of the sentence has the actor in front of the action

- Australian companies manufacture millions of precision machine tools

Passive Voice:

When the structure of the sentence has the receiver in front of the action

- Millions of precision machine tools are manufactured by Australian companies

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Make Your Proposal Clear to Evaluator

- Be specific
 - Speak to the evaluator in your own language
 - Never fear using little words
 - Omit needless words
- Avoid using clichés
- Be careful when using acronyms (spell out first time used and then use only the acronym afterwards)

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Be Specific

- Avoid generalizations
- Be definite and concrete
 - **Poor:** The launch was delayed because of unfavorable weather.
 - **Better:** High winds delayed the launch.
 - **Best:** Winds over 50 knots delayed the launch for three days.
- Good proposals are data rich – they deal in particulars and present the details that matter
- Steamboat test
 - If your description works as well for a steamboat as it does for our system, then the description is not sufficiently specific

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Never Fear Using Little Words

- Big words often name little things
- Learn to use little words in a big way
 - It might not be easy...
 - Little words tend to say exactly what you mean
- Remember, most big things have little names
 - Dawn – Peace
 - Love – War
 - Life – God
 - Death – Hope

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Omit Needless Words

- Also unnecessary sentences and paragraphs (just as a drawing should contain no unnecessary lines or a machine should contain no unnecessary parts)

<i>Incorrect</i>	<i>Correct</i>
The question as to whether	whether (the question whether)
There is no doubt that	no doubt (doubtless)
Used for fuel purposes	used for fuel
He is a man who	he
The reason is that	because
Owing to the fact that	since (because)
In spite of the fact that	though (although)
The fact that the tank failed	the tank failed
The fact that the test did not succeed	the test was unsuccessful

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Keep It Simple

is representative of	<i>typifies</i>
is clear that	<i>clearly</i>
is plain that	<i>plainly</i>
kept under surveillance	<i>watched</i>
made an investigation of	<i>investigated</i>
notwithstanding the fact that	<i>although</i>
a considerable margin	<i>QUANTIFY</i>
on account of	<i>because</i>
on the basis of	<i>by</i>
period of time	<i>interval – period</i>
pertaining to	<i>about</i>
pursuant to	<i>following</i>
separate into two equal parts	<i>halve</i>
take appropriate measures	<i>act</i>

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Good Writing – A Review

- Be more or less specific
- Don't be redundant; don't use more words than necessary; it's highly superfluous
- One should never generalize
- The passive voice is to be avoided
- Parenthetical remarks (however relevant) are unnecessary
- Avoid clichés like the plague (They are old hat.)
- Prepositions are not words to end sentences with
- Employ the vernacular
- Foreign words and phrases are not apropos
- Eschew ampersands & abbreviations, etc.
- Understatement is always best
 - Exaggeration is a billion times worse than understatement
- Analogies in writing are like feathers on a snake
- Even if a mixed metaphor sings, it should be derailed

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NSRP PROPOSAL WRITING WORKSHOP – EXPANDED CHECKLIST

The following items shall be included/adhered to in all proposals submitted to the NSRP ASE Program. Failure to submit the required documents and adhere to the requirements **MAY** result in the proposal being disqualified.

- _____ 1. Technical and Cost Proposal in Separate Volumes
- _____ 2. One electronic copy of a Technical Proposal on digital media (CD or equivalent, but not email); paper copies optional
- _____ 3. An original signed Cost Proposal (unbound), 2 bound copies (3 total), plus 1 electronic copy
- _____ 4. Technical Proposal page count does not exceed 40 (excluding Cover Page, Table of Contents, List of Figures and Tables, Cross Reference to Evaluation Criteria, Resumes, Statement of Work, Letters of Commitment, and Teaming Agreement/Memorandum of Agreement)
- _____ 5. Proposal text is a fixed pitch font of 12 or fewer characters per inch or proportional font point size 10 or larger
- _____ 6. Cover Page identifies Proposer, Team Members and Abstract Number
- _____ 7. Proposer certifies that, if selected for award, the proposer will abide by the terms and conditions of the NSRP ASE Technology Investment Agreement dated 24 September 2010.
- _____ 8. Proposer provides permission to use a technical summary of the proposal in preparing future SIP updates and research announcements

9. The following Sections and tables are included in the Technical Volume:

- _____ Cross Reference to Evaluation Criteria (Compliance Matrix)
- _____ Executive Summary

The following **mandatory** tables are included in the Executive Summary:

- _____ Metrics Table (also in section 5.0 of SOW)
- _____ Team Member Level of Effort
- _____ Summary Work Statement and Funding Plan
- _____ Cost Share Summary
- _____ Key Deliverables and Criteria for Phase Continuation
- _____ Sub-Initiative Relative Level of Effort
- _____ Man-hour and Material Cost Summary

Technical Approach

- _____ Background/Scope/Objectives
 - _____ *Understanding of the problem and/or technology/process deficiency*
 - _____ *Scope*
 - _____ *Project Objectives: Vision, Solutions, Benefit Metrics*

NSRP PROPOSAL WRITING WORKSHOP – EXPANDED CHECKLIST

Technical Discussion

- Essence of the Approach*
- Technical detail and Analysis to support the proposed approach*
- Development and Analysis of “new and creative” solutions*
- Key technical, schedule and cost risks identification, analysis and mitigation*
- Sustainment Funding Requirements*
- Follow-on Work Funding*

State-of-the-Practice

- Current state of the art/literature searches and comparison of approaches*
- Current limitations of general technology area/process*
- Connections to on going or past projects*
- Definition of technical baseline*
- Research Organization*
- Need for Government Funding*

People and Organizational Impacts

- Organizational Change to be accommodated*
- Impact to Human Resource Functions*
- Education/Training*

Business Case

- Definition of Business Need*
- Breadth of Applicability*
- Need for NSRP ASE Support*
- Identification of Project Metrics*
- Identification of Project Benefits*

Risk Management

- Identification of Risks*
- Risk Management Approach to include:*
 - Risk Impact*
 - Severity of Risk*
 - Risk Acceptance*
 - Risk Mitigation*

Implementation & Technology Transfer

- Technology Transfer Outline*
- Deliverable Distribution*
- Technology Transfer Activities*
- Training Materials*
- Proprietary Materials*

Project Management

- Management and Technical Team*

NSRP PROPOSAL WRITING WORKSHOP – EXPANDED CHECKLIST

- _____ *Qualifications, Capabilities, and Experience of the Proposed Personnel*
- _____ *Past Performance of the Company or Team Members*
 - _____ *Description of relevant experience*
 - _____ *Description of relevant IR&D Work*
 - _____ *Current Status of contract*
- _____ *Prime Contractor Responsibilities*
- _____ *Team Member/Subcontractor(s) Responsibilities*
- _____ *University or other Support Identification*
- _____ *Resumes of Key Personnel provided in Appendix A*
- _____ *Letters of Commitment provided in Appendix C*
- _____ *Description of unique team capabilities*
- _____ *Identification of key facilities and resources*

Project Organization

- _____ *Solidarity of companies/team members and their ability to conduct difficult technical programs*
- _____ *Organization Chart with Key Personnel including subcontractors and University*
- _____ *Extent to which top people are assigned to the project*
- _____ *Extent to which priority is given to this work within the company*

Project Schedule

- _____ *Schedule Chart with:*
 - _____ *Each Major Task in the SOW identified*
 - _____ *Proposed Phases with Entrance and Exit criteria*
 - _____ *Milestones of specific deliverables*
 - _____ *Phases match up those in cost proposal*

Related Proposals

- _____ *Identification of other proposals that are dependent upon this proposal, or vice versa*
- _____ *Identification of co-dependency*
- _____ *Identification of Cost Share*

Appendices

- _____ *A. Resumes of Key Personnel (No more than 2 pages each)*
- _____ *B. Statement of Work (SOW)*
 - _____ *Scope*
 - _____ *Detailed Description of Task(s)*
 - _____ *Technical/Design Reviews*
 - _____ *Deliverables*
 - _____ *Metrics/Benefit Realization (including table)*
- _____ *Letters of Commitment*

_____ 10. Project duration is within RA guidance

11. The following information is included in the Cost Volume (*Other spreadsheet programs may*

NSRP PROPOSAL WRITING WORKSHOP – EXPANDED CHECKLIST

be used other than the Excel file provided, but the same information MUST be submitted in accordance with the cost proposal requirements):

- _____ Signed Cost Proposal Summary Sheet
 - _____ Program Cost Proposal Summary Sheet
 - _____ Program-Funded Costs by Task Sheet
 - _____ Budget Narrative Section Provided
 - _____ Labor Categories and Associated Labor Rates and Hours for Offeror’s Direct Labor Costs
 - _____ List of Team Members and Total Cost for Each
 - _____ List of Subcontractors/Consultants and Total Cost for Each Subcontractor Consultant
 - _____ Indirect Rate Certification
 - _____ Preferred Payment Method Identified
 - _____ Financial Viability Information
 - _____ Program Travel Breakdown Sheet
 - _____ Program Cost Share Detail Sheet
 - _____ Cost Share Explanation
 - _____ Sufficient Cost Data provided
- _____ 12. Format requirements (Font size, line spacing, margins ...) are in accordance with the published guidelines

**Proposed Tank Welding Process Change
Business Case Analysis**

Ship Class	CVN	SSN	SSBN	SC	LCS	AWS	CLF	MPF	Support
AS IS									
Number of tanks	200	50	70	50	20	25	15	15	10
Avg Length (ft)	40	20	25	20	15	20	20	20	20
Avg width (ft)	40	10	12	20	12	20	20	20	20
Avg height (ft)	10	8	8	8	6	8	8	8	8
Avg weld length per tank (ft)	360	152	180	192	132	192	192	192	192
Total weld length (ft)	72000	7600	12600	9600	2640	4800	2880	2880	1920
Weld speed today (ft/min)	0.25	0.2	0.2	0.25	0.25	0.25	0.25	0.25	0.25
Efficiency factor	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5
Labor hours today	9600	1583	2625	1280	352	640	384	384	256
Cost per labor hour (\$)	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00
Inspection labor factor	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total tank fab labor	\$ 686,400	\$ 113,208	\$ 187,688	\$ 91,520	\$ 25,168	\$ 45,760	\$ 27,456	\$ 27,456	\$ 18,304
Steel plate used per tank (ft2)	4000	560	792	1120	504	1120	1120	1120	1120
Total steel plate (ft2)	800000	28000	55440	56000	10080	28000	16800	16800	11200
Scrap rate	7%	9%	9%	7%	7%	7%	7%	7%	7%
Total plate used (ft2)	856000	30520	60429.6	59920	10785.6	29960	17976	17976	11984
Steel plate cost per ft2	\$ 35.00	\$ 50.00	\$ 50.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 20.00	\$ 20.00
Total steel cost	\$ 29,960,000	\$ 1,526,000	\$ 3,021,480	\$ 1,498,000	\$ 269,640	\$ 749,000	\$ 449,400	\$ 359,520	\$ 239,680
TOTAL TANK COST AS IS	\$ 30,646,400	\$ 1,639,208	\$ 3,209,168	\$ 1,589,520	\$ 294,808	\$ 794,760	\$ 476,856	\$ 386,976	\$ 257,984
TO BE									
Number of tanks	200	50	70	50	20	25	15	15	10
Avg Length (ft)	40	20	25	20	15	20	20	20	20
Avg width (ft)	40	10	12	20	12	20	20	20	20
Avg height (ft)	10	8	8	8	6	8	8	8	8
Avg weld length per tank (ft)	360	152	180	192	132	192	192	192	192
Total weld length (ft)	72000	7600	12600	9600	2640	4800	2880	2880	1920
Weld speed (ft/min)	0.4	0.33	0.33	0.4	0.4	0.4	0.4	0.4	0.4
Efficiency factor	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5
Labor hours	6000	960	1591	800	220	400	240	240	160
Cost per labor hour (\$)	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00	\$ 65.00
Inspection labor factor	8%	8%	8%	8%	8%	8%	8%	8%	8%
Total tank fab labor	\$ 421,200	\$ 67,364	\$ 111,682	\$ 56,160	\$ 15,444	\$ 28,080	\$ 16,848	\$ 16,848	\$ 11,232
Steel plate used per tank (ft2)	4000	560	792	1120	504	1120	1120	1120	1120
Total steel plate (ft2)	800000	28000	55440	56000	10080	28000	16800	16800	11200
Scrap rate	5%	7%	7%	5%	5%	5%	5%	5%	5%
Total plate used (ft2)	840000	29960	59320.8	58800	10584	29400	17640	17640	11760
Steel plate cost per ft2	\$ 35.00	\$ 50.00	\$ 50.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 25.00	\$ 20.00	\$ 20.00
Total steel cost	\$ 29,400,000	\$ 1,498,000	\$ 2,966,040	\$ 1,470,000	\$ 264,600	\$ 735,000	\$ 441,000	\$ 352,800	\$ 235,200
TOTAL TANK COST TO BE	\$ 29,821,200	\$ 1,565,364	\$ 3,077,722	\$ 1,526,160	\$ 280,044	\$ 763,080	\$ 457,848	\$ 369,648	\$ 246,432
REAL COST SAVINGS PER SHIP	\$ 825,200	\$ 73,845	\$ 131,446	\$ 63,360	\$ 14,764	\$ 31,680	\$ 19,008	\$ 17,328	\$ 11,552

Explanation

For this example, the business case is expressed by looking at the potential cost savings per ship using the proposed technology (sheet 1). Sheet 2 shows the predicted cost savings applied to the Navy's current 30-year shipbuilding plan.

AS IS	This section will tabulate the "as-is" cost of tank fabrication for several classes of ships
Number of tanks	Number of tanks on a ship of the designated class
Avg Length (ft)	
Avg width (ft)	
Avg height (ft)	
Avg weld length per tank (ft)	Uses tank length, width and height to calculate length of all welded joints in a tank
Total weld length (ft)	Multiplies weld length of a single tank by # of tanks in the ship
Weld speed today (ft/min)	Estimate of average weld speed in feet per minute
Efficiency factor	Accounts for activities besides welding that go into total time to complete tank welding (setup, turnovers, weld cleaning, in-process inspection, etc.)
Labor hours today	Total labor hours to weld all tanks on a single ship of the designated class (total weld length/weld speed/60/efficiency factor)
Cost per labor hour (\$)	
Inspection labor factor	Labor surcharge for inspection of final welds yielding rework
Total tank fab labor	$(\text{Labor hours} * \text{Cost per hour}) * (1 + \text{Inspection Labor Factor})$
Steel plate used per tank (ft ²)	
Total steel plate (ft ²)	Steel plate used per tank * # of tanks
Scrap rate	Amount of material discarded during the fabrication process
Total plate used (ft ²)	Total steel plate * (1+Scrap Rate)
Steel plate cost per ft ²	Market value of steel plate
Total steel cost	Total plate used * Market value
TOTAL TANK COST AS IS	Sum of Total tank labor and Total sheet cost
TO BE	This section applies improvements resulting from the proposed technology to show potential cost savings in tank fabrication per ship.
	Unless noted entries/formulas are equal to the "AS-IS" condition

Number of tanks
Avg Length (ft)
Avg width (ft)
Avg height (ft)
Avg weld length per tank (ft)
Total weld length (ft)
Weld speed (ft/min) Faster weld speed due to use of new technology
Efficiency factor
Labor hours
Cost per labor hour (\$)
Inspection labor factor Lower factor due to less rework from using the new technology
Total tank fab labor

Steel plate used per tank (ft²)
Total steel plate (ft²)
Scrap rate Lower scrap rate due to improved manufacturing processes (predicted benefit of new technology)
Total plate used (ft²)
Steel plate cost per ft²
Total steel cost

TOTAL TANK COST TO BE

**REAL COST SAVINGS
PER SHIP** (Total Tank Cost AS-IS) - (Total Tank Cost TO BE)

30 YEAR SHIPBUILDING PLAN

	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>
CVN	0	1	0	0	0	1	0	0	0	0	1	0	0	0
SSN	2	2	2	2	2	2	2	2	2	2	2	2	2	2
SSBN	0	0	0	0	0	0	0	0	1	0	0	1	0	1
SC	2	1	2	1	2	2	2	2	2	2	2	2	1	2
LCS	3	4	6	6	6	6	6	6	0	0	0	0	0	0
AWS	0	0	0	0	0	1	1	1	0	2	0	1	1	1
CLF	0	0	0	0	0	0	0	1	0	2	2	2	2	2
MPF	0	2	1	2	1	0	0	0	0	0	0	0	0	0
Support	1	2	1	2	2	0	1	1	1	2	0	2	3	2
Total Ships	8	12	12	13	13	12	12	13	6	10	7	10	9	10

Fixed price ships under contract

30 YEAR SHIPBUILDING PLAN (Adjusted)

	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>
CVN	0	1	0	0	0	1	0	0	0	0	1	0	0	0
SSN	0	0	0	2	2	2	2	2	2	2	2	2	2	2
SSBN	0	0	0	0	0	0	0	0	1	0	0	1	0	1
SC	0	0	0	1	2	2	2	2	2	2	2	2	1	2
LCS	0	0	6	6	6	6	6	6	0	0	0	0	0	0
AWS	0	0	0	0	0	1	1	1	0	2	0	1	1	1
CLF	0	0	0	0	0	0	0	1	0	2	2	2	2	2
MPF	0	2	1	2	1	0	0	0	0	0	0	0	0	0
Support	0	0	0	2	2	0	1	1	1	2	0	2	3	2
Total Ships	0	3	7	13	13	12	12	13	6	10	7	10	9	10

POTENTIAL SAVINGS

CVN	\$ -	\$ 825,200	\$ -	\$ -	\$ -	\$ 825,200	\$ -	\$ -	\$ -	\$ -	\$ 825,200	\$ -	\$ -	\$ -
SSN	\$ -	\$ -	\$ -	\$ 147,689	\$ 147,689	\$ 147,689	\$ 147,689	\$ 147,689	\$ 147,689	\$ 147,689	\$ 147,689	\$ 147,689	\$ 147,689	\$ 147,689
SSBN	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 131,446	\$ -	\$ -	\$ 131,446	\$ -	\$ 131,446
SC	\$ -	\$ -	\$ -	\$ 63,360	\$ 126,720	\$ 126,720	\$ 126,720	\$ 126,720	\$ 126,720	\$ 126,720	\$ 126,720	\$ 126,720	\$ 63,360	\$ 126,720
LCS	\$ -	\$ -	\$ 88,584	\$ 88,584	\$ 88,584	\$ 88,584	\$ 88,584	\$ 88,584	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
AWS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 31,680	\$ 31,680	\$ 31,680	\$ -	\$ 63,360	\$ -	\$ 31,680	\$ 31,680	\$ 31,680
CLF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 19,008	\$ -	\$ 38,016	\$ 38,016	\$ 38,016	\$ 38,016	\$ 38,016
MPF	\$ -	\$ 34,656	\$ 17,328	\$ 34,656	\$ 17,328	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Support	\$ -	\$ -	\$ -	\$ 23,104	\$ 23,104	\$ -	\$ 11,552	\$ 11,552	\$ 11,552	\$ 23,104	\$ -	\$ 23,104	\$ 34,656	\$ 23,104

TOTAL POTENTIAL SAVINGS

Development Period	\$ -													
Transition (1/3 potential)	\$ 286,619													
Implementation (90% potential)		\$ 95,321	\$ 321,654	\$ 363,083	\$ 1,097,886	\$ 365,603	\$ 382,710	\$ 375,666	\$ 359,000	\$ 1,023,863	\$ 448,790	\$ 283,861	\$ 448,790	

GOV'T BUSINESS CASE

Investment*	\$ (1,200,000)	\$ (2,400,000)												
Potential cost savings	0	\$ 286,619	\$ 95,321	\$ 321,654	\$ 363,083	\$ 1,097,886	\$ 365,603	\$ 382,710	\$ 375,666	\$ 359,000	\$ 1,023,863	\$ 448,790	\$ 283,861	\$ 448,790
Net Cash Flow	\$ (1,200,000)	\$ (2,113,381)	\$ 95,321	\$ 321,654	\$ 363,083	\$ 1,097,886	\$ 365,603	\$ 382,710	\$ 375,666	\$ 359,000	\$ 1,023,863	\$ 448,790	\$ 283,861	\$ 448,790

IRR **13%**

*Assume half of \$2.4M project total is provided as cost share. Cost of transition is equal to total cost of development.

<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>	<u>2030</u>	<u>2031</u>	<u>2032</u>	<u>2033</u>	<u>2034</u>	<u>2035</u>	<u>2036</u>	<u>2037</u>	<u>2038</u>	<u>2039</u>
1	0	0	0	1	0	0	0	0	1	0	0	0	1	0
2	2	2	2	1	2	1	2	1	2	1	2	1	2	1
1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
0	0	0	0	0	0	0	1	0	5	5	5	5	5	5
0	2	0	1	1	1	0	2	0	1	1	1	0	2	0
2	2	0	0	1	0	1	1	1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	1	1	1	1	1	1	0	0	0	0
11	10	6	7	9	8	7	11	7	13	11	11	9	13	9

<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>	<u>2030</u>	<u>2031</u>	<u>2032</u>	<u>2033</u>	<u>2034</u>	<u>2035</u>	<u>2036</u>	<u>2037</u>	<u>2038</u>	<u>2039</u>
1	0	0	0	1	0	0	0	0	1	0	0	0	1	0
2	2	2	2	1	2	1	2	1	2	1	2	1	2	1
1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
0	0	0	0	0	0	0	1	0	5	5	5	5	5	5
0	2	0	1	1	1	0	2	0	1	1	1	0	2	0
2	2	0	0	1	0	1	1	1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	1	1	1	1	1	1	0	0	0	0
11	10	6	7	9	8	7	11	7	13	11	11	9	13	9

\$ 825,200	\$ -	\$ -	\$ -	\$ 825,200	\$ -	\$ -	\$ -	\$ -	\$ 825,200	\$ -	\$ -	\$ -	\$ 825,200	\$ -
\$ 147,689	\$ 147,689	\$ 147,689	\$ 147,689	\$ 73,845	\$ 147,689	\$ 73,845	\$ 147,689	\$ 73,845	\$ 147,689	\$ 73,845	\$ 147,689	\$ 73,845	\$ 147,689	\$ 73,845
\$ 131,446	\$ 131,446	\$ 131,446	\$ 131,446	\$ 131,446	\$ 131,446	\$ 131,446	\$ 131,446	\$ 131,446	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080	\$ 190,080
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 14,764	\$ -	\$ 73,820	\$ 73,820	\$ 73,820	\$ 73,820	\$ 73,820	\$ 73,820
\$ -	\$ 63,360	\$ -	\$ 31,680	\$ 31,680	\$ 31,680	\$ -	\$ 63,360	\$ -	\$ 31,680	\$ 31,680	\$ 31,680	\$ -	\$ 63,360	\$ -
\$ 38,016	\$ 38,016	\$ -	\$ -	\$ 19,008	\$ -	\$ 19,008	\$ 19,008	\$ 19,008	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 23,104	\$ -	\$ -	\$ -	\$ 11,552	\$ 11,552	\$ 11,552	\$ 11,552	\$ 11,552	\$ 11,552	\$ 11,552	\$ -	\$ -	\$ -	\$ -

\$ 1,219,982 \$ 513,532 \$ 422,294 \$ 450,806 \$ 1,154,529 \$ 461,202 \$ 383,337 \$ 520,109 \$ 383,337 \$ 1,152,019 \$ 342,879 \$ 398,942 \$ 303,970 \$ 1,170,134 \$ 303,970

\$ 1,219,982 \$ 513,532 \$ 422,294 \$ 450,806 \$ 1,154,529 \$ 461,202 \$ 383,337 \$ 520,109 \$ 383,337 \$ 1,152,019 \$ 342,879 \$ 398,942 \$ 303,970 \$ 1,170,134 \$ 303,970
\$ 1,219,982 \$ 513,532 \$ 422,294 \$ 450,806 \$ 1,154,529 \$ 461,202 \$ 383,337 \$ 520,109 \$ 383,337 \$ 1,152,019 \$ 342,879 \$ 398,942 \$ 303,970 \$ 1,170,134 \$ 303,970

30-Year Shipbuilding Plan

The plan in place as of 27 October 2010 was used for this example. The current plan is available on the internet.

**30-Year Shipbuilding Plan
(Adjusted)**

Ships already under a fixed-price contract were removed from consideration since use of new technology would not result in a reduction of the ship's price.

Total Potential Savings

Development Period

Technology is under development, therefore no cost saving is possible.

Transition (1/3 potential)

Technology is being transitioned to shipyards, author assumes a 66% discount on potential cost savings.

Implementation (90% potential)

To be conservative, author assumes a 10% discount on cost savings following transition.

GOV'T BUSINESS CASE

Potential cost savings

Sum of cost savings possible for each ship being built in that year (with any discounts applied).

Net Cash Flow

Sum of cash outflows (development and transition) and inflows (savings due to technology use).

30 YEAR SHIPBUILDING PLAN

	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>
CVN	0	1	0	0	0	1	0	0	0	0	1	0	0	0
SSN	2	2	2	2	2	2	2	2	2	2	2	2	2	2
SSBN	0	0	0	0	0	0	0	0	1	0	0	1	0	1
SC	2	1	2	1	2	2	2	2	2	2	2	2	1	2
LCS	3	4	6	6	6	6	6	6	0	0	0	0	0	0
AWS	0	0	0	0	0	1	1	1	0	2	0	1	1	1
CLF	0	0	0	0	0	0	0	1	0	2	2	2	2	2
MPF	0	2	1	2	1	0	0	0	0	0	0	0	0	0
Support	1	2	1	2	2	0	1	1	1	2	0	2	3	2
Total Ships	8	12	12	13	13	12	12	13	6	10	7	10	9	10

Fixed price ships under contract

30 YEAR SHIPBUILDING PLAN (Adjusted)

	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>
CVN	0	1	0	0	0	1	0	0	0	0	1	0	0	0
SSN	0	0	0	2	2	2	2	2	2	2	2	2	2	2
SSBN	0	0	0	0	0	0	0	0	1	0	0	1	0	1
SC	1	0	0	1	2	2	2	2	2	2	2	2	1	2
LCS	0	0	6	6	6	6	6	6	0	0	0	0	0	0
AWS	0	0	0	0	0	1	1	1	0	2	0	1	1	1
CLF	0	0	0	0	0	0	0	1	0	2	2	2	2	2
MPF	0	2	1	2	1	0	0	0	0	0	0	0	0	0
Support	0	0	0	2	2	0	1	1	1	2	0	2	3	2
Total Ships	1	3	7	13	13	12	12	13	6	10	7	10	9	10

POTENTIAL SAVINGS

CVN	\$ -	\$ 16,472,000	\$ -	\$ -	\$ -	\$ 16,472,000	\$ -	\$ -	\$ -	\$ -	\$ 16,472,000	\$ -	\$ -	\$ -
SSN	\$ -	\$ -	\$ -	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364
SSBN	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,615,781	\$ -	\$ -	\$ 4,615,781	\$ -	\$ 4,615,781
SC	\$ 2,149,600	\$ -	\$ -	\$ 2,149,600	\$ 4,299,200	\$ 4,299,200	\$ 4,299,200	\$ 4,299,200	\$ 4,299,200	\$ 4,299,200	\$ 4,299,200	\$ 4,299,200	\$ 2,149,600	\$ 4,299,200
LCS	\$ -	\$ -	\$ 3,530,880	\$ 3,530,880	\$ 3,530,880	\$ 3,530,880	\$ 3,530,880	\$ 3,530,880	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
AWS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,074,800	\$ 1,074,800	\$ 1,074,800	\$ -	\$ 2,149,600	\$ -	\$ 1,074,800	\$ 1,074,800	\$ 1,074,800
CLF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 644,880	\$ -	\$ 1,289,760	\$ 1,289,760	\$ 1,289,760	\$ 1,289,760	\$ 1,289,760
MPF	\$ -	\$ 1,286,400	\$ 643,200	\$ 1,286,400	\$ 643,200	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Support	\$ -	\$ -	\$ -	\$ 857,600	\$ 857,600	\$ -	\$ 428,800	\$ 428,800	\$ 428,800	\$ 857,600	\$ -	\$ 857,600	\$ 1,286,400	\$ 857,600

TOTAL POTENTIAL SAVINGS

Development Period	\$ -													
Transition (1/3 potential)		\$ 5,919,467												
Implementation (90% potential)			\$ 3,756,672	\$ 12,043,659	\$ 13,399,419	\$ 27,840,819	\$ 13,401,939	\$ 13,982,331	\$ 13,411,030	\$ 12,738,171	\$ 24,856,491	\$ 15,925,054	\$ 10,222,131	\$ 15,925,054

GOV'T BUSINESS CASE

Investment*	\$ (1,500,000)	\$ (3,000,000)												
Potential cost savings	0	\$ 5,919,467	\$ 3,756,672	\$ 12,043,659	\$ 13,399,419	\$ 27,840,819	\$ 13,401,939	\$ 13,982,331	\$ 13,411,030	\$ 12,738,171	\$ 24,856,491	\$ 15,925,054	\$ 10,222,131	\$ 15,925,054
Net Cash Flow	\$ (1,500,000)	\$ 2,919,467	\$ 3,756,672	\$ 12,043,659	\$ 13,399,419	\$ 27,840,819	\$ 13,401,939	\$ 13,982,331	\$ 13,411,030	\$ 12,738,171	\$ 24,856,491	\$ 15,925,054	\$ 10,222,131	\$ 15,925,054

IRR **259%**

*Assume 2X cost of development to transition

<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>	<u>2030</u>	<u>2031</u>	<u>2032</u>	<u>2033</u>	<u>2034</u>	<u>2035</u>	<u>2036</u>	<u>2037</u>	<u>2038</u>	<u>2039</u>
1	0	0	0	1	0	0	0	0	1	0	0	0	1	0
2	2	2	2	1	2	1	2	1	2	1	2	1	2	1
1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
0	0	0	0	0	0	0	1	0	5	5	5	5	5	5
0	2	0	1	1	1	0	2	0	1	1	1	0	2	0
2	2	0	0	1	0	1	1	1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	1	1	1	1	1	1	0	0	0	0
11	10	6	7	9	8	7	11	7	13	11	11	9	13	9

<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>	<u>2030</u>	<u>2031</u>	<u>2032</u>	<u>2033</u>	<u>2034</u>	<u>2035</u>	<u>2036</u>	<u>2037</u>	<u>2038</u>	<u>2039</u>
1	0	0	0	1	0	0	0	0	1	0	0	0	1	0
2	2	2	2	1	2	1	2	1	2	1	2	1	2	1
1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
0	0	0	0	0	0	0	1	0	5	5	5	5	5	5
0	2	0	1	1	1	0	2	0	1	1	1	0	2	0
2	2	0	0	1	0	1	1	1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	1	1	1	1	1	1	1	0	0	0	0
11	10	6	7	9	8	7	11	7	13	11	11	9	13	9

\$ 16,472,000	\$ -	\$ -	\$ -	\$ 16,472,000	\$ -	\$ -	\$ -	\$ -	\$ 16,472,000	\$ -	\$ -	\$ -	\$ 16,472,000	\$ -
\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 5,557,364	\$ 2,778,682	\$ 5,557,364	\$ 2,778,682	\$ 5,557,364	\$ 2,778,682	\$ 5,557,364	\$ 2,778,682	\$ 5,557,364	\$ 2,778,682	\$ 5,557,364	\$ 2,778,682
\$ 4,615,781	\$ 4,615,781	\$ 4,615,781	\$ 4,615,781	\$ 4,615,781	\$ 4,615,781	\$ 4,615,781	\$ 4,615,781	\$ 4,615,781	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800	\$ 6,448,800
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 588,480	\$ -	\$ 2,942,400	\$ 2,942,400	\$ 2,942,400	\$ 2,942,400	\$ 2,942,400	\$ 2,942,400
\$ -	\$ 2,149,600	\$ -	\$ 1,074,800	\$ 1,074,800	\$ 1,074,800	\$ -	\$ 2,149,600	\$ -	\$ 1,074,800	\$ 1,074,800	\$ 1,074,800	\$ -	\$ 2,149,600	\$ -
\$ 1,289,760	\$ 1,289,760	\$ -	\$ -	\$ 644,880	\$ -	\$ 644,880	\$ 644,880	\$ 644,880	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
\$ 857,600	\$ -	\$ -	\$ -	\$ 428,800	\$ 428,800	\$ 428,800	\$ 428,800	\$ 428,800	\$ 428,800	\$ 428,800	\$ -	\$ -	\$ -	\$ -

\$ 31,717,174 \$ 18,055,174 \$ 14,959,750 \$ 15,927,070 \$ 29,217,368 \$ 16,312,990 \$ 13,425,248 \$ 18,390,334 \$ 13,425,248 \$ 29,631,747 \$ 12,306,134 \$ 14,421,027 \$ 10,952,894 \$ 30,213,147 \$ 10,952,894

\$ 31,717,174 \$ 18,055,174 \$ 14,959,750 \$ 15,927,070 \$ 29,217,368 \$ 16,312,990 \$ 13,425,248 \$ 18,390,334 \$ 13,425,248 \$ 29,631,747 \$ 12,306,134 \$ 14,421,027 \$ 10,952,894 \$ 30,213,147 \$ 10,952,894
\$ 31,717,174 \$ 18,055,174 \$ 14,959,750 \$ 15,927,070 \$ 29,217,368 \$ 16,312,990 \$ 13,425,248 \$ 18,390,334 \$ 13,425,248 \$ 29,631,747 \$ 12,306,134 \$ 14,421,027 \$ 10,952,894 \$ 30,213,147 \$ 10,952,894