

**NATIONAL SCIENCE FOUNDATION  
DIRECTORATE FOR ENGINEERING  
ENGINEERING RESEARCH CENTERS PROGRAM**

**FY 2015  
GUIDELINES FOR  
PREPARING  
ANNUAL REPORTS  
AND  
RENEWAL PROPOSALS**

**for the  
ENGINEERING RESEARCH CENTERS  
AND  
NANOSCIENCE ENGINEERING RESEARCH CENTERS**

**CLASSES OF 2006-2012**

**January 2015**

Engineering Education & Centers Division  
4201 Wilson Boulevard, Suite 585  
Arlington, VA 22230  
Phone: (703) 292-8380  
Facsimile: (703) 292-9051/9052



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## Major Changes since the Release of the FY 2012 Guidelines

### CHANGES (AND REMINDERS) IN ANNUAL REPORT

We would like to emphasize the following in the annual reporting guidelines. In addition, major changes or additions to the Guidelines document are noted in red font throughout the document.

- *Change - Center must use Research.gov to notify NSF that their Annual Report has been submitted.* FastLane will no longer be available to submit reports, see Section 6.2. The Center will submit the Annual Report to the ERC Program Specialist directly.
- *Reminder - Reporting on Translational Research Awards.* Centers are required to include a 2-3 page write-up of their SBIR-ERC Collaborative Opportunity (SECO) and other ERC Translational Research Awards in Volume II of the annual report. Summary statements should also be included in the discussions of technology transfer and translational research in Volume I as described later in this Guideline. See sections 4.5.2, 4.5.2.1, and 4.5.4.4.
- *Change:* As of FY 2013, Gen-3 ERCs are no longer required to have foreign university partnerships, therefore, the Gen-3 ERC will report only on past foreign university partnerships that are governed by an existing formalized partnership agreement between the foreign university and the ERC. All other foreign collaborations for both Gen-2 and Gen-3 ERCs will be reported as collaborating institutions.
- *Change:* For Gen-3 ERCs, the term “desired skill sets” is replacing the term “educational hypothesis”.
- *Reminder and Change:* The ERC will provide a summary of the diversity strategic plan in the narrative (see section 4.5.5.2) and insert the complete diversity strategic plan in Appendix IV in Volume I (see section 4.9.4).
- *Reminder: Reporting on Graduate Research Supplements.* Centers are required to include a 2-3 page write-up of their Graduate Research Supplements in Volume II. See section 5.3.
- *Reminder: IRB Certification.* In addition to research that involves human subjects, if data are collected on the performance of ERC students (REU or regular and the impact of pre-college programs on students) and these data are presented to the public through a publication or talk at a conference, an IRB Human Subjects approval is required. An IRB certification from *each* institution conducting the work is required. In addition, if the research involves vertebrate animals, Institutional Animal Care and Use Committee (IACUC) approval is required from *each* institution where such research is conducted. See section 4.9.2
- *Change: Table of contents moved to front of Volume I*
- *Change: Subaward budgets are required with each year’s annual budget request.* The total of the subaward budgets must equal the total subaward budget on Line G5 of NSF form 1030. See section 4.8. This is a new requirement per guidance from the Division of Grants and Agreements, thereby eliminating prior guidance that related the size of the subaward and the budget request requirement.
- *Change:* For renewal proposals, the bibliography should include a list of publications over the past three years.
- *Change: If applicable, the total cost sharing over the term of the cooperative agreement must be shown in the budget request for the first year.* See section 4.8.
- *Reminder: Centers are reminded that there should be sufficient overall technical content in Volume I (particularly in the Strategic Research and Overall Research Program section).* This is required so that the reader can understand significant technical accomplishments in

each of the thrusts and testbeds without referring to Volume II for detailed project by project descriptions.

- *Reminder: All centers, regardless of class, will use the 3-plane strategic planning chart with barriers, revised in 2009. See <https://www.erc-reports.org/public/library>*
- *Reminder: There is a new [NSF Proposal and Award Policies and Procedures Guide](#), effective December 26, 2014.  
<http://www.nsf.gov/pubs/policydocs/pappguide/nsf15001/index.jsp>*
- *Change: Table 9b, University Support by Institution, no longer required for Class of 2008 (except CBERC). See Section 4.5.5.3.*
- *Change: Cross-Education Activities chart has new columns. See Section 4.5.3*
- *Change: Centers must discuss safety procedures and protocol that have been implemented in the ERC laboratories. See Section 4.5.5.4.*
- *Change: A new section in the project reports in Volume 2 that discusses foreign collaborations, if that is part of the project. See Section 5.3.*

#### CHANGES TO DATA ENTRY IN ERCWEB

- *Change: Table 1 has been modified to report separately the number of provisional patents and full patents.*

#### CHANGES TO CENTER PRODUCED TABLES

- *Change: Table 9c, International Partner Universities—Funding and Collaboration Activities, has been modified to include collaboration activities as well as funding information. See Section 4.5.5.3.*
- *Change: Table 9d, Collaboration Activities with International Partner Universities, has been added. See Section 4.5.5.3.*

## **1 INTRODUCTION**

The purpose of this document is to provide information to Engineering Research Centers (ERCs) in the Classes of 2006 through 2012 regarding the requirements for the preparation of their respective annual performance reports or renewal proposals. (The ERCs in the Class of 2003 will use the Final Reporting Guidelines to guide the preparation of their annual and final reports.) The special features required of the Gen-3 ERCs, starting with the Class of 2008 and continuing through the Class of 2011 and the 2012 Nanosystems ERCs (NERCs), are also noted in the following guidelines. The function of the Annual Report (submitted as a renewal proposal in the case of centers in their 3<sup>rd</sup> or 6<sup>th</sup> years) is to communicate the ERC's vision, plans, activities, achievements and impacts in all aspects of center operations. Because a renewal proposal has the same general structure and content as the Annual Report, in these Guidelines the term "Annual Report" will also refer to the renewal proposal. Where there are differences, they will be noted. The Annual Report is an opportunity for each center to present a unified picture of the strategic scope of the research, education, and industrial collaboration/innovation ecosystem programs, details about individual research projects and how they fit into the center's vision, and the progress and impacts the ERC is making and milestones achieved. The Annual Report also contains plans for the next year and, for renewal proposals, plans for the next five (third year renewal proposals) or four (sixth year renewal proposals) years.

The Annual Report provides the ERC's leadership team with a valuable internal management tool to assess accomplishments in each key feature and overall management function and restructure as needed. It also serves as a communication tool for the ERC with its university administration and its Industrial and Scientific Advisory Boards. In addition, the NSF Program Director and site visit team members use the Annual Report to assess the individual ERC's performance. The ERC Program Leader also uses the full set of reports to monitor the aggregate of all the centers' performance and to prepare reports regarding the outcomes and impacts of the ERC Program to NSF management, the Office of Management and Budget (OMB), and Congress.

## **2 PLANNING FOR THE ANNUAL REPORT**

Although the deployment of the on-line database system, ERCWeb, has made producing the required tables and charts easier, producing the Annual Report itself is still a major undertaking and one of the main responsibilities of the Center Director and the Administrative Director during the year. The center leadership team should meet several months before the report is due to develop a plan and schedule for the preparation of the document and assign chapter and section responsibility. The Director and Deputy Director must be directly involved throughout the process by writing sections and supervising the preparation of the content for the remaining sections, reviewing drafts, and ensuring the integration of all portions. The goal is a final document that is a strong, accurate, and complete reflection of the center's activities and accomplishments during the year. The better the report and data quality, the easier it is for the reviewers to understand a center's achievements and plans and for the ERC's NSF Program Director to prepare a recommendation for the next year's funding or renewal approval recommendation. Additional information and suggestions helpful to the Administrative Director can be found in Chapter 6, Administrative Management, and Chapter 9, Multi-University ERCs, of the on-line ERC Best Practices Manual at [http://www.erc-assoc.org/manual/bp\\_index.htm](http://www.erc-assoc.org/manual/bp_index.htm).

## 2.1 Report Preparation Steps

The Center's Administrative Director should review the important documentation that establishes the ERC reporting requirements when planning for the Annual Report begins. These include the following documents:

- *Center's Cooperative Agreement.* The center's Cooperative Agreement is the mechanism by which the ERC is funded and it is updated periodically to reflect major changes in center personnel or research plans and testbeds. It includes the center's responsibilities and NSF's responsibilities and describes annual reporting and performance review procedures and requirements. It can be obtained from [Fastlane](https://www.fastlane.nsf.gov/) <https://www.fastlane.nsf.gov/> - Proposals, Awards & Status - Award and Reporting Functions - View/Print Award Documents or directly with login:
- [\*NSF Proposal and Award Policies and Procedures Guide\*](#)
- *ERCWeb Annual Report Data Entry System* contains data entry screens, associated explanations and help screens. Available at <https://www.erc-reports.org>; log in using userID and password, select Data Entry for your Center.
- *The [ERCWeb Library](#) site contains the following documents plus others useful to the operations of the center*
  - o *[Guidelines for ERCWeb Data Entry](#): The *Guidelines for ERCWeb Data Entry* contains screen by screen instructions for data entry into the ERCWeb Annual Report Data Entry System organized by data entry "tabs" as seen on the entry screens. It also contains a complete glossary of terms that will supplement the glossary contained in this document.*
  - o *[FY 2013 Guidelines for Preparing Annual Reports and Renewal Proposals](#) (this document)*
  - o *[Performance Review Criteria](#): The criteria define the characteristics, behaviors and results that describe high quality performance and low quality performance as a function of the age of the center. The site visit review team and NSF staff use these criteria to perform their evaluation of the center.*

Table 2.1.1, below, summarizes the steps to be taken in preparing the Annual Report together with the data submission.



	<b><u>Annual Report</u></b>	<b><u>Data</u></b>
<b><u>Study</u></b>	Annual Report Guidelines at ERCWeb Library <a href="https://www.erc-reports.org/public/library">https://www.erc-reports.org/public/library</a> Study performance review criteria (by Gen2/Gen/3 and by age of Center) for each feature of the Center.	Obtain ERCWeb Account Study Data Base Documentation at ERCWeb Library <a href="https://www.erc-reports.org">https://www.erc-reports.org</a> ERCWeb Tutorial Learn data entry screens
<b><u>Plan</u></b>	Develop timeline for report (due to NSF 5 wks. prior to site visit) Schedule Site Visit date with Program Director Printed annual or renewal report due in NSF office 5 weeks before day 1 of site visit. Set due date for data input to ERCWeb Volume I sections Volume II project summaries Assign section responsibilities	Develop data collection mechanism  Develop data entry strategy (some data to be entered on-going basis, some needs to wait until end of Reporting Year, etc.)
<b><u>Do</u></b>	Prepare drafts, review, edit Volume I: Narrative sections, certifications, budget requests  Volume II: Project summaries, biographical sketches, bibliographies...	Collect required ERC data Enter data on ERCWeb data entry screens SUPPORT Tab: Organizational sources of support ACADEMIC INSTITUTIONS Tab: Academic partners PERSONNEL Tab: ERC Personnel demographic data RESEARCH Tab: Thrust and Project information BUDGETS Tab: Annual Expenditures, Functional and Educational Budget Submit data to ERCWeb "SUBMIT" button
<b><u>Integrate</u></b>	Analyze data tables from ERCWeb, integrate into report	Download annual report data tables from ERCWeb for Vol. I
	Internal review, final edit cycles Print and ship reports and CDs to NSF 5 weeks before site visit	

*Table 2.1.1 Annual Report and Data Submission Process*

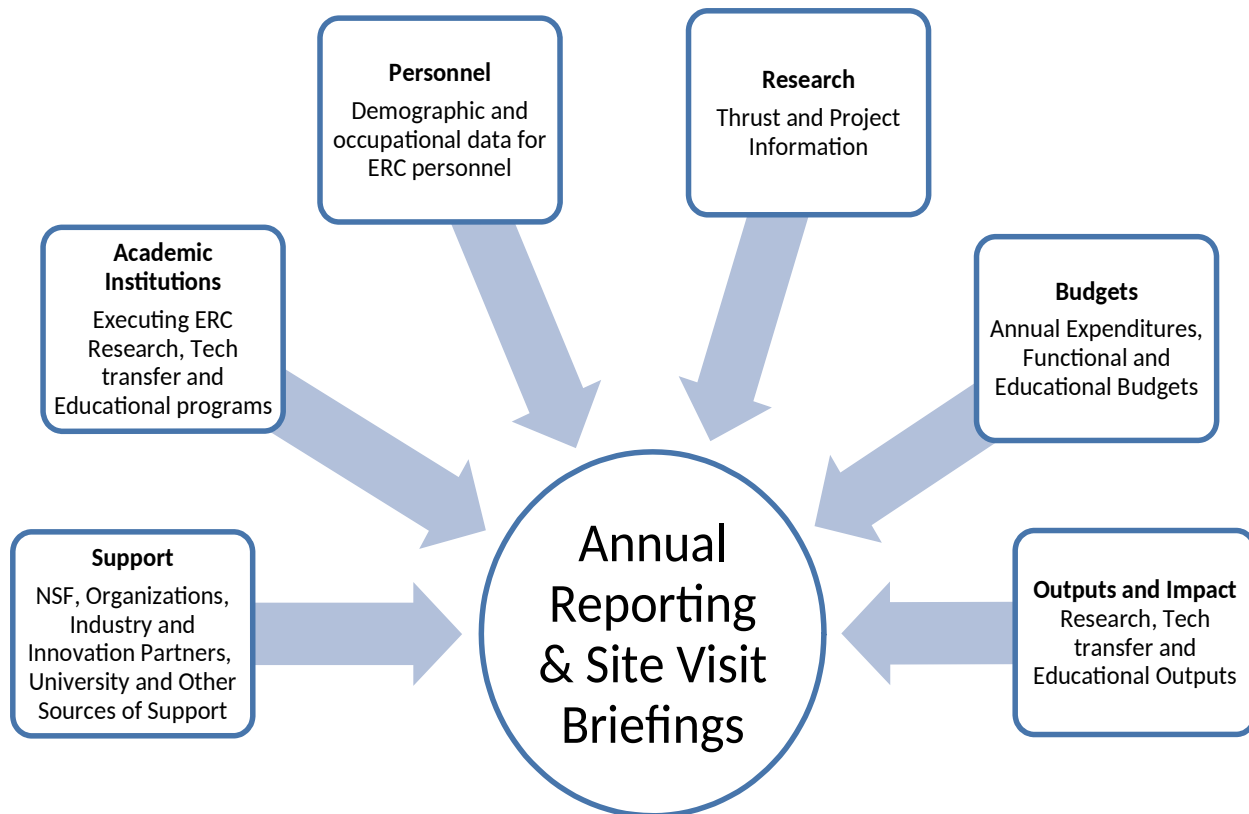
## 2.2 Requirements for New Centers:

### 2.2.1 Development of a Data Collection System

Each center must develop a data collection system and associated timeline to ensure that all necessary data are collected from the lead, partner, and collaborating institutions in time to compile and enter the data into the ERCWeb database. This process is described more completely in the *Guidelines for ERC-Web Data Entry*. It is important to review the ERCWeb input screens and the *Guidelines for ERC-Web Data Entry* so that the requirements for data are understood. The sources of data needed should be identified early in the process and a system of collecting that data should be developed. When it is time to assemble the Annual Report, the

center inserts several tables produced by the ERCWeb database, as well as center-created tables and figures, into the Annual Report as directed in this document. The center needs to base its timeline for producing the Annual Report on the end of its Reporting Year. Any changes in NSF required data should be noted and adjustments/additions made to the data collection process.

A summary of the major changes to the Annual Report from 2012 to 2013 is provided at the beginning of this document. A summary of the ERCWeb produced tables and the corresponding data entry screens is provided in Section 3.1. Figure 2.2.1 gives a visual depiction of the information and the data entry screens.



*Figure 2.2.1: ERCWeb input screens have six data entry tabs to enter the required data*

### 2.2.2 Financial Management System

One of the first things that new centers must contend with is establishing a financial management system. As soon as the first year of ERC support reaches the lead institution, the center must be ready to begin allocating and spending it. All cash support from NSF, industry member fees, and other sources of direct support, such as industrial sponsored project support or a Research Experiences for Teachers site awarded to the center should be placed in an account(s) controlled by the center. A center’s sponsored projects office may be able to split large awards from other sources in which the ERC is one of multiple recipients so that the center’s funds go into the center’s account. This allows the center to get “credit” for receiving the support and gives the ERC control over the funds. At the lead institution the center’s financial management system must include a plan to manage all sources of support including methods to account for cost-share and sub-contract budget proposals, approvals, fund allocations, expense approvals, and payment and budget allocation expectations/timeframes.

The financial management system must be able to manage cost-share across the center and at the sub contract level (budgets and expenses; institutionally and at the project level) and also be able to manage sub-contract budget proposals and allocations both institutionally and at the project/test bed level. The center must also collect financial information about associated projects that are key to achieving the ERC's strategic goals. This is discussed further in the *Guidelines for ERC-Web Data Entry*.

Given the magnitude of NSF ERC Program support, all ERCs must have financial management systems that can successfully survive an audit by NSF auditors from the Office of the Inspector General (OIG), or the Division of Institution and Award Support (DIAS), which is connected with the unit that oversees the awarding of ERC cooperative agreements. Any questions about financial management may be posed to Charlie Zeigler, [czeigler@nsf.gov](mailto:czeigler@nsf.gov), 703-292-4578 from DIAS. He has extensive experience helping ERCs improve their cost accounting and financial documentation and is available to help.

### **3 CONTENT AND STRUCTURE OF AN ANNUAL REPORT**

The Annual Report consists of two separate volumes, aptly titled Volume I and Volume II. Volume I provides the reviewers and NSF with an integrative summary of the evolution of the vision and plans, activities, infrastructure, and impacts of the ERC. Volume I should communicate the full scope of the ERC with sufficient technical depth that the reader fully understands the breadth, depth, and value added of the ERC. It contains data representing the impacts of the center, its personnel, sources of support, and expenditures. Volume II provides further in-depth information to support Volume I through brief summaries of the individual research and education projects and other supporting information. Some required tables, figures and participant lists for both volumes are provided from the ERCWeb database system, see <https://www.erc-reports.org>

The Annual Report should be developed in a manner that best suits an individual center's strategic research plan and accomplishments within the structure outlined in this document. It should describe how the support provided to the center has resulted in a synergy of research, education, outreach, diversity, and industrial collaboration efforts (innovation ecosystem for Gen-3) and their impacts that could not have been achieved by a collection of single awards. This guidance represents the baseline information to be included; beyond that, the ERC may include other pertinent information to yield an informative document that will communicate in the best fashion for that center.

It is advisable for the Center Director to prepare the draft of the Systems Vision, Value Added, and Broader Impacts section first to assure that the report has a high level, integrated summary of its vision, structure and impacts. This will serve as a reference for those preparing the separate sections. When those sections are complete, this first section should be finalized, accounting for new findings and impacts.

Volume I has the following structure. Each component is described in further detail in Section 4.

- Cover Pages
- Table of Contents
- Project Summary
- Table of Participants
- Narrative

- o Systems Vision and Value Added/Broader Impacts of the Center
- o Strategic Research Plan and Overall Research Program
- o University and Pre-college Education
- o Industrial/Practitioner Collaboration and Technology Transfer (*Innovation Ecosystem* for Gen-3)
- o Infrastructure
  - Configuration & Leadership
  - Diversity Strategy and Impact
  - Management
  - Resources & University Commitment
- References Cited
- Bibliography of Center Publications
- Budget Requests (NSF Form 1030)
- Appendices
  - o Summary List of Appendices
  - o Appendix I: Glossary and Acronyms
  - o Appendix II: Agreements and Certifications
  - o Appendix III: ERCWeb Table 7
  - o Appendix IV: Center Diversity Plan

Volume II has the following structure and content. Each component is described in further detail in Section 5.

- Table of Contents
- List of ERC Projects
- Project Summaries
- Associated Project Abstracts
- Data Management Plan (for Renewal Proposals)
- Biographical Sketches
- Current and Pending Support

### 3.1 Annual Report Tables and Figures

The Annual Report contains several tables and figures. Many of the required tables and figures are generated within ERCWeb; however, there are several that are Center-generated. The summaries below identify the ERCWeb and Center-produced tables and figures required in the Annual Report. Please be sure to include all required tables and figures before submitting the Annual Report.

#### 3.1.1 ERCWeb-Produced Table and Chart Summary

<b>ERCWeb Support Data EntryTab Produces</b>	<b>Based On</b>
Table 1: Quantifiable Outputs	
Table 1a: Average Metrics Benchmarked Against All Active ERCs and the Center’s Tech Sector	Reporting Year
Table 4: Industrial/Practitioner Members, Innovation Partners, Funders of Sponsored Projects, Funders of Associated Projects, and Contributing Organizations	Award Year
Table 4a: Organization Involvement in Innovation and Entrepreneurship Activities	Reporting Year
Table 5: Innovation Ecosystem Partners and Support, by Year	Award Year
Figure 5a: Technology Transfer Activities	Reporting Year

Figure 5b: Lifetime Industrial/Practitioner Membership History	Award Year
Figure 5c: Total Number of Industrial/Practitioner Members	Award Year
Figure 5d: Industrial/Practitioner Member Support, by Year	Award Year
Table 9: Sources of Support	Award Year
Table 10: Annual Expenditures and Budget	
Table 11: Modes of Support, by Industry and Other Practitioner Organizations	Award Year
<b>ERCWeb Academic Institutions Data Entry Tab Produces</b>	
Table 6: Institutions Executing the ERC’s Research, Technology Transfer, and Education Programs	Reporting Year
Table 7: ERC Personnel	Reporting Year
Table 7f: Center Diversity, by Institution	Reporting Year
<b>ERCWeb Personnel Data Entry Tab Produces</b>	
Table 1a: Average Metrics Benchmarked Against All Active ERCs and the Center’s Tech Sector	
Table 3b: Ratio of Graduates to Undergraduates	Reporting Year
Table 6: Institutions Executing the ERC’s Research, Technology Transfer, and Education Programs	Reporting Year
Figure 6a: Location of Lead, Core Partner(s), and all Domestic Collaborating Institutions	Reporting Year
Figure 6b: Foreign Location of Participating Institutions	Reporting Year
Figure 6c: Country of Citizenship of ERC Foreign Personnel	Reporting Year
Table 7: ERC Personnel	Reporting Year
Table 7a: Diversity Statistics for ERC Faculty and Students	Reporting Year
Figure 7b: Women in the ERC	Reporting Year
Figure 7c: Underrepresented Racial Minorities in the ERC	Reporting Year
Figure 7d: Hispanics/Latinos in the ERC	Reporting Year
Figure 7e: Persons With Disabilities in the ERC	Reporting Year
Table 7f: Center Diversity, by Institution	Reporting Year
<b>ERCWeb Research Data Entry Tab Produces</b>	
Table 2: Estimated Budgets by Research Thrust and Cluster	Award Year
Figure 2a: Research Project Investigators by Discipline	Award Year
Table 8: Current Award Year Functional Budget	Award Year
Figure 8a: Functional Budget as a Percentage of Direct Support	Award Year
Figure 8b: Functional Budget as a Percentage of Associated Project Support	Award Year
Table 9: Sources of Support	Award Year
Volume II: Project and Personnel Data	Reporting Year
<b>ERCWeb Budgets Data Entry Tab Produces</b>	
Table 8: Current Award Year Functional Budget	Award Year
Figure 8a: Functional Budget as a Percentage of Direct Support	Award Year
Figure 8b: Functional Budget as a Percentage of Associated Project Support	Award Year
Table 8c: Current Award Year Education Functional Budget	Award Year
Table 10: Annual Expenditures and Budget	Award Year
<b>ERCWeb Outputs and Impact Data Entry Tab Produces</b>	
Table 1: Quantifiable Outputs	Reporting Year
Table 1a: Average Metrics Benchmarked Against All Active ERCs and the Center’s Tech Sector and Class	Reporting Year
Table 3a: Educational Impact	Reporting Year

Note: see *Guidelines for ERC-Web Data Entry* for definition of “Reporting Year” and “Award Year.”

### 3.1.2 Center-Produced Table and Chart Summary

<b>Center-Produced Table and Chart Summary</b>	
<b>Section 4.3 - Participants Tables</b>	
	Lead and Partnering Institutions
	List of the Leadership Team
	Thrust Table
	Non-University Partners
	Scientific Advisory Board
<b>Section 4.5.2.1 ERC's Strategic Research Plan</b>	
	Three-Plane Strategic Chart
	Milestone Chart
<b>Section 4.5.2.2 ERC's Strategic Research Plan</b>	
	Translational Research Partners Table (moved to Innovation Ecosystem section)
<b>Section 4.5.3 University and Pre-College Education Programs</b>	
	Education Activities Matrix
<b>Section 4.5.4.3 Technology Transfer</b>	
	ERC Intellectual Property Table
	Technology Transfer Table
	Technology Transfer Chart
<b>Section 4.5.4.4 Innovation</b>	
	ERC Start-Up Firms Table
	Technology Translation Innovation Proposals Submitted by the Center
	Translational Research Partners Table (moved from Strategic Research Plan section)
<b>Section 5.3 - Management Effort</b>	
	Table 8b: Portion of Current Award Year Budget, by Institution
	Table 9a: History of ERC Funding of the Center
	Table 9b: Cost Sharing by Institution
	Table 9c: International Partner Universities--Funding and Collaboration Activities (Gen-3)
	<b>Table 9d: Collaboration Activities with International Partner Universities</b>
	Table 10a: Unexpended Residual in the Current Award and Proposed Award Year

## 4 VOLUME I REQUIREMENTS

Volume I contains the body of the report (or renewal proposal for centers in their 3<sup>rd</sup> or 6<sup>th</sup> year) and is ideally 100 pages in length or less. This count excludes the required NSF graphics and tables, required NSF forms, appendices and budget pages. Volume I contains narrative interspersed with required NSF tables and charts produced by ERCWeb as described in this section. The ERCWeb tables and charts should be placed within the narrative after the first time

they are discussed (they are not to be collected and presented at the end of the document, except as noted in the instructions) and must be sized and presented to be easily readable. This is especially important for the ERCWEB tables that may be returned to the ERC in small font sizes. The reader should not have to get out a magnifying glass to read the tables. Also, the font color must be readable against the background color of a row. All required tables must be included in the Annual Report or the ERC funding will be withheld until the required tables are submitted.

#### **4.1 Cover Pages**

The ERC's own cover page should be the outermost cover page of the Annual Report. It should include the title of the center, followed by "an Engineering Research Center" (if that is not in the title). Next it should list the lead and any core partner institutions involved and the names of the Director and Deputy Director. It should also indicate the following information:

- (a) The year of the Annual Report, e.g. first Annual Report (or the year of the renewal proposed, e.g., third or sixth-year renewal proposal);
- (b) The due date of the report (i.e., day, month, year); and
- (c) The cooperative agreement number.

The following page will be page 1 of the official NSF cover page (NSF Form 1207). The appropriate certification boxes, e.g., Human Subjects and Animal Subjects, etc., should be checked. If human and/or animal subjects are included in the ERC, the report or renewal proposal must include Institutional Review Board Certifications from *each* applicable institution in the appendices. See Section 4.9.2.

#### **4.2 Table of Contents**

The Table of Contents should indicate the page numbers and titles of all the sections and appendices. The Table of Contents should also list the title and page number for each ERCWeb table or figure under the relevant section. Each section should be tabbed with text titles.

#### **4.3 Project Summary**

The Project Summary is a one-page summary of the goals, programs, and achievements of the ERC. The summary should be updated annually, contain an overview, and address intellectual merit and broader impacts. This summary must be prepared according to the instructions in the [NSF Proposal and Award Policies and Procedures Guide](#). The summary must provide specific information relevant to the NSF Intellectual Merit and Broader Impacts review criteria. An Annual Report that does not include a one page project summary as described in the [NSF Proposal and Award Policies and Procedures Guide](#) **will be returned**. The summary should be written in the third person and in a style that will be easily understood by an educated lay audience. NSF should be able to use the narrative in documents for the public without having to rewrite it or request clarification from the center before using it. NSF ERC program staff also use the Project Summary as part of the documentation taken forward to NSF approval boards for renewal proposals so it is important that this page be accurate and up-to-date.

#### **4.4 Participants Tables**

The Participant Tables are a required component that **MUST** be included in the report to assist the ERC's Program Director in determining NSF and site visit team conflicts-of-interest (COI) issues, as well as to assist the reviewers in determining the team members and their disciplines and affiliations.

The ERC should develop Participants Tables with the following sections.

- List of partnering academic institutions (domestic for Gen-2 centers, and domestic and foreign for Gen-3 centers where the partnership is governed by a formal agreement between the foreign university and the ERC)
  - Column Headings: Name, Role in Partnership, City, State / Country (if not U.S. institution)
  - One institution per row, start with lead institution and bold lead institution’s name

<u>Name of Institution</u>	<u>Role</u>	<u>City</u>	<u>State / Country</u>
<b>University of X</b>	<b>Lead Institution</b>		
	Domestic Partner Institution		
	Foreign Partner Institutions		

- List of the Leadership team
  - Column Headings: Position title, Name, Department (or ERC Staff), Institution
  - One individual per row

<u>Position Title</u>	<u>Name</u>	<u>Department (or “ERC Staff”)</u>	<u>Institution</u>
e.g. Director			

- List each thrust in separate thrust table.
  - Title each table with the name of the Thrust
  - Column Headings: Position title, Name, Institution, Department
  - One individual per row (the first row should be the thrust leader)
  - List all faculty members involved in that thrust

<u>Thrust Name</u>			
<u>Position Title</u>	<u>Name</u>	<u>Department</u>	<u>Institution</u>
e.g. Thrust Leader			
e.g. Faculty Researcher			

- List of non-university partners carrying out ERC’s mission such as federal laboratories, community colleges, pre-college institutions, and, for Gen-3 centers, innovation partners (organization devoted to promoting entrepreneurship and innovation) and small business partners carrying out translational research. Create a separate table for each type of non-university partner with the following features:
  - Column Headings: Name of institution, organization or partner, City, State
  - One institution per row

<u>Name of institution / organization/ partner</u>	<u>City</u>	<u>State</u>



- Scientific Advisory Board, Industrial Advisory Board, and other advisory boards, make one table per board
  - o Column Headings: Name, Title, Organization
  - o One individual per row

<u>Name</u>	<u>Title</u>	<u>Organization (Department or Division)</u>	<u>Institution or Firm</u>

#### 4.5 Narrative

The reference point for the narrative is the reporting year in the context of the age of the center. There is a different level of expectations for centers in their first three years of operation than for centers in their second three years or in their last four years of NSF/ERC support. This can be seen in the ERC performance review criteria that can be found in the library section of the ERCWeb log-in page <https://www.erc-reports.org/public/library> in the Performance Review section in the Criteria and Protocol documents. The narrative text should provide information for NSF and the reviewers to assess the extent and quality of the ERC’s progress and plans within the context of the ERC performance review criteria.

It must be clear to the reader which results were made in the last year and which were made in earlier years. This is especially true for renewal proposals where the prior three-year performance period is assessed.

In addition, each section of the report must address future plans, including describing how any requested growth in funding will be expended and how the project(s) to be supported by the additional funds fit within the strategic plan and benefit the center overall.

ERCWeb charts and tables should be inserted into the report sections as indicated and discussed in the text. The font must be a size that is easily legible when the report is printed. Except for ERCWeb Table 7, which comprises Appendix III, they should not be grouped together at the end of the report or in an Appendix.

**Renewal Proposals.** For renewal proposals, clear statements of the plans for the renewal period and any new directions proposed in research, education, or industrial partnerships must be provided. In addition, trend charts, to show progress over the previous years of funding, on diversity, total financial support, and the number of industrial/practitioner members must be provided. Only data on member firms that have signed a membership agreement with the ERC and provided the requisite membership fees (these must be cash or in-kind support) should be shown in these trend charts. Inclusion of firms that have promised support but not delivered puts the center at risk for misrepresenting information to obtain Federal funds, a serious offense. For third-year renewal proposals, data for the current year and each of the two previous years should be included in the trend charts; for sixth-year renewal proposals, data for the current year and each of the five previous years should be included in the trend charts.

**ERC Innovation Awards and/or ERC-SBIR Partnership Awards.** Centers that received ERC Innovation Awards in FY 2009 and/or ERC-SBIR and other ERC Translational Research Awards (e.g. SECO awards) should report on the results of the awards in the appropriate section of the Annual Report. For example, centers receiving testbed or translational research awards

would report on the progress in the Strategic Research Plan and Overall Research Program section; centers receiving awards related to innovation or technology transfer would report on the progress in the Industrial/Practitioner Collaboration and Technology Transfer section. For each award, the goals and objectives should be summarized along with the progress made toward achieving those goals. Volume II should also include a project report for each translational research award.

The headings that follow throughout section 4.5 of these Guidelines should appear, in the order shown, as the headings in the Annual Report.

#### 4.5.1 Systems Vision and Value Added of the Center

This section should provide the reader with a clear statement of the center's vision and the historical evolution of the vision to the present, and impacts of the center through time. It is important for our review and recommendation system that these impacts be presented in both technical and quantitative terms as well, if appropriate. Summary information on actual and potential economic impacts of the ERC's research and technology should be presented, such as the potential or actual market impacts, infrastructure impacts, people impacted if the technology is realized, energy saved, etc. as appropriate to the vision.

##### *4.5.1.1 Systems Vision*

The current systems vision statement should be short and clear, focusing the reader on the systems-level goal(s) and potential impact. There also should be a statement of the systems vision at the time of funding for new ERCs or provided in the latest renewal proposal for older ERCs to show the evolution of the vision over time. A rationale should be provided as to why the systems technology is transformational. The fundamental barriers that the center is addressing should be discussed. This must be supported by a state-of-the-art / state-of-the-practice analysis of what is lacking now without the achievement of the fundamental research and the systems-level goals, how industry/practice has been or will be strengthened or transformed by its realization, and why this is important for society in general. The theory and science underpinning the center's research and the evolution of the vision over time should be discussed in summary here with more detail in the research section.

This section must also include direct actions actually taken (not just planned) by the ERC in response to major weaknesses and any threats regarding the vision that were identified in the Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of the prior annual or renewal review site visit report.

##### *4.5.1.2 Value Added and Broader Impacts*

The overall goal of this section is to convey to the reader, in a summary form, the significant and cumulative impacts that the center has made since its inception, including its impacts on knowledge, education, technology and industry/practice (including impacts on innovation for Gen-3 centers), on society in general, and on the quality and diversity of the science and engineering workforce. This section should deliver a clear message about the outcomes and impacts that have resulted so far from the integrative construct of an ERC as opposed to the type that would emanate from a series of single investigator awards. For centers in their first year, this would be the expected impact.

The following specific areas should be summarized in the narrative of this section. More detailed information should be presented in later sections of the report.

Research:

- *Engineered Systems-level Approach and Advances.* Indicate how the research program is contributing (or, for newer ERCs, positioned to contribute) to systems-level advances. Discuss the role of key systems level testbeds. Discuss the lessons learned and any corrective measures taken.
- *Research Productivity.* Address the ERC’s research productivity using indicators such as publications, patents granted, licenses issued, recognition awards to center faculty and students, scientific breakthroughs in knowledge and technology (not just incremental advances), front cover articles in journals, etc.
- *Translational Research Awards.* For Gen-3 centers and Gen-2 centers receiving translational research awards or carrying out translational research in collaboration with innovation partners and/or small businesses, summarize the translational research work and results to date.
- *FY 2009 Innovation Awards.* For ERCs that received ERC Program Innovation Awards in FY 2009, summarize the results to date and indicate if the project is completed.

Education Outcomes:

- For Gen-2 and Gen-3 centers, provide evidence that the ERC has effectively developed a *culture* that is developing ERC graduates who are more effective in industrial practice.
- In addition, for Gen-3 centers in their third year and beyond, provide evidence that the ERC is developing engineers who are more effective in industrial practice and, in addition, are prepared to be *more creative, adaptive, and innovative* in a global economy.
- Summarize any significant educational exchanges with industry and the external community, including workshops, efforts to provide students with information about regulatory bodies that impact the use of the ERC’s technology, etc. and the results of such exchanges.
- Highlight interdisciplinary curriculum impacts.
- Summarize the ERC’s pre-college program efforts and results in terms of teacher and student involvement in efforts to bring engineering concepts and experiences to the pre-college classroom and pre-college participants in the ERC.

Industrial Collaboration and Technology Transfer Interactions (*Innovation Ecosystem for Gen-3*):

- *Summarize the role of industry/practitioners* in the ERC as sponsors and participants.
- *Summarize major technology transfer events* including licenses for technology that are being developed actively and/or have been commercialized, and spin off firms or product lines that resulted from ERC research.
- If applicable, *identify any workshops or other efforts* focused on standards, regulatory issues, or policy issues that impact the ERC’s technology.

Team and its Diversity:

- *Describe the interdisciplinary makeup* of the team.
- *Summarize progress on the participation of underrepresented groups* as members of the leadership faculty, research faculty and student teams since the center’s inception.

The ERCWeb **Table 1**, “Quantifiable Outputs”, and **Table 1a**, “Average Metrics Benchmarked Against All Active ERCs and the Center’s Tech Sector” should be inserted in this section. The

information in these tables should be used to support the center's analysis of the impacts of the ERC *vis-à-vis* those in the center's technology sector and all ongoing ERCs.

#### 4.5.1.3 Highlights of Significant Achievements and Impacts

Also required in this section of the Annual Report are specific “nuggets” or “highlights” of significant achievement and impact that are a result of the integrative, interdisciplinary construct of the ERC. NSF has placed a new emphasis on writing highlights for a broad public audience; the targeted audiences for the requested highlights include Congress and other federal/state policymakers; business and industry; the general public; and NSF (for internal briefings, speeches, and websites). The NSF Office of Legislative and Public Affairs (OLPA) adapts these highlights for the new public website "*Science, Engineering, and Education (SEE) Innovation.*" To preview the website, see: <http://www.research.gov/seeinnovation> .

In addition to a title, each highlight should include the following three sections in narrative form:

- Outcome/Accomplishment. Describe the outcome using language anyone can understand; all highlights should emphasize major impacts achieved because of the interdisciplinary construct of the ERC, especially those things that could not have been achieved by a single investigator type project alone;
- Impact and Benefits. Describe the benefits to society, economy, industry, nation, region, science & engineering in a style that is intended for the educated lay reader and tells a story about what happened, why it is significant, what its impact has been or will be, and why it took an ERC to achieve it; and
- Explanation and Background. Provide additional explanation of the outcome and its impact (e.g. the technical background).

Each highlight must include an image that illustrates the concept or shows the technology that anyone can understand.

The better the examples and accompanying narratives are, the more effectively the center will communicate its impacts to its reviewers and to NSF.

#### Additional Highlights Reporting Requirements

- The highlights reported should cover achievements made during the last year; and for a renewal, during the last three years, with the year of achievement marked.
- There is no explicit requirement for, or limit on, the number of highlights, but they should have the following characteristics: 1) be accomplishments of major significance; and 2) have passed a significant milestone or have come to fruition during the reporting year—and not be simply a report of incremental advancement of a “work in progress.”
- Highlights should be reported in the following categories: Research/Technology Advancements, Education, Technology Transfer (including successful spinoff/start-up companies), and Infrastructure (including large databases that function as a national resource, large testbeds and new facilities).
- The highlights may be inserted into the report in a font less than 12 point (Times New Roman) or 10 point (Arial), if they take up too much space, but they must be readable. They must be included in this section, not in an Appendix.
- Highlights used in a previous report may not be repeated unless they provide background for major recent advances or impacts that have taken place since the highlight was first reported, unless it is a renewal proposal, For a renewal proposal, highlights from the

current year and significant highlights from the last two years may be included. In this case, please mark the year each highlight was originally achieved/reported.

These highlights will be the principal source documents for ERC Program and NSF documents and budget requests. When a center sends their Annual Report on a CD to the ERC Program's communications consultant, Mr. Courtland Lewis, (see section 6.2), he extracts selected highlights for use in the required NSF reports. He may contact centers whose highlights are chosen for inclusion in these reports for additional information. A selected number of highlights from all the ERCs are posted on the ERC Association website (<http://www.erc-assoc.org>) in the achievements showcase. A few are selected by the Director of EEC who recommends them to the Assistant Director of Engineering, who in turn selects a few from across the directorate for recommendation to the NSF Director for inclusion in NSF's report to the Office of Management and Budget (OMB). Excellent ERC highlights result in recognition of an individual center's achievements and the achievements of the ERC Program throughout NSF, at OMB and the White House, and in Congress.

#### 4.5.2 Strategic Research Plan and Overall Research Program

This section describes the ERC's strategic research plan and provides summary information on the research program that has been structured to achieve the goals of the plan. ***This section should summarize results from the previous three years (fewer if the center is less than three years old) with more detail for the last year.*** It should include a summary description of the evolution of the strategic research plan since inception to communicate how the research goals and deliverables of the ERC have changed over time in response to advances in the state of the art and practice at the ERC and elsewhere. In addition, any major new research directions for the proposed year(s), such as new thrusts and/or testbeds, should be described. Detailed project-level information is provided in Volume II.

The ERC's strategic plan must be represented using the ERC Program 3-Plane Strategic Planning Chart. All ERCs must use the revised ERC Program 3-Plane Strategic Planning Chart (with barriers). These are key barriers that impede progress toward the realization of their vision. A template can be found on the ERCWeb library website <https://www.erc-reports.org/public/library> under the section, "ERC Planning Information."

#### Strategic Research Plan Reporting Requirements

- The ERC's strategic research plan should be described in the context of the state of the art, the center's goals, and the fundamental knowledge and technological barriers that the ERC is addressing, and, for the Class of 2012 NERCs, the rationale for the need for a large body of fundamental nanoscale research.
- This section must include a thorough state-of-the-art / state-of-the-practice analysis to position the ERC's strategic plan.
- It should address significant and challenging barriers that can lead to breakthroughs in knowledge; it should address breakthrough enabling technology needed to achieve the systems goals; and it should address challenging systems level research and explorations in enabling systems technology testbeds.
- The ERC's customization of the ERC Program's 3-plane strategic planning chart is required. It will illustrate how the center's systems-level goals, and barriers in the way of achieving those goals, motivate and drive the research plan and how these goals integrate fundamental, enabling technology, and systems-level research, as well as proof-of-

concept testbeds, to address barriers and to deliver discoveries, advances in knowledge, and new technology.

- Given the strategic research plan, a rationale should be provided for the structure of the research program into thrusts or groupings of projects. Specific justification should be provided for the inclusion of significant associated projects in the ERC's strategic research plan. This section should include justification for the disciplinary makeup of the faculty team and a discussion of plans to fill in gaps.

This section must also include a Milestone Chart that depicts major goals and deliverables over the 10-year time frame of NSF support. Greater detail is expected within a five-year time horizon. The Milestone Chart should contain the following information about the research program of the center:

- Deliverables and milestones as a function of the age of the center with more detail within the five-year time horizon.
- An indication of the plane of the three plane chart in which the deliverable or milestone predominantly resides (e.g. fundamental, technology or systems level).
- The discussion of the Milestone Chart should include a discussion of progress made on previously identified deliverables and milestones including achievements as well as delays and setbacks. Any changes to the original milestones and deliverables as the center matures and new barriers or opportunities are uncovered should also be discussed.

Budget plan for the next year/renewal period: If the center's budget is in the phase where there is a projected increase in the base budget in the cooperative agreement, this section will include a plan for how the proportion of those funds to be dedicated to research will be used. If the center is in the flat funding phase, this section should discuss any projects/thrusts to be eliminated and new project/thrusts to be added. The same information should be provided in renewal proposals but in the context of the time period requested in the renewal. If the center's budget is in the phase where the projected budget is in phase-down, this section will include a plan for how the reduction will impact research. A table summarizing this information should also be created.

Foreign Collaboration. For collaborative research with foreign investigators, either through university to ERC partnerships governed by a formal agreement for Gen-3 ERCs, or as faculty-to-faculty collaborations for Gen-2 and Gen-3 ERCs, the center should discuss how the partnership/collaboration adds value to the research and education programs. The center should discuss: (a) how the foreign collaborations/partnerships provide expertise complementary to that provided by the domestic partners; (b) how the partnerships/collaborative projects fit under the ERC's strategic vision; and (c) how the partnership provides cross-cultural research and educational experiences for U.S. and foreign partners' students and faculty.

Translational Research; Translational research is a relatively new area being conducted by the centers. It bridges the gap between traditional university fundamental research (including ERC proof-of-concept research in testbeds), innovation and transfer to industry. The SBIR-ERC Collaborative Opportunity (SECO) solicitation is available to fund translational research projects that are partnerships between suitable small businesses and ERCs. This occurs when center-funded fundamental and technology research projects reach the appropriate phase and after center industrial members decline their first option to license. This type of partnering is required of Gen-3 centers, and some Gen-2 centers are also exploring translational research opportunities through SECO, the FY 2009 ERC Innovation Awards, or other funding for translational research including partnerships with larger firms through sponsored project support. This section of the

Annual Report should discuss the role of the center’s translational research activities in the overall context of the center’s strategic plan. For newer Gen-3 ERCs, the center should discuss the *planned* role of partnerships with small firms in translational research in preparation for the time when the ERC research reaches the appropriate phase. For Gen-2 or Gen-3 centers that are currently pursuing translational research efforts, the center should name the firm(s) involved and describe the role of their translational research in the ERC and how it contributes to the ERC’s strategic innovation goals.

Response to Previous SWOT: To bring the reader up to date on the progress from the last site visit, this section must include actual responses (not just planned, and not just repeated from the response to the previous year’s site visit report) indicating direct actions taken in response to major weaknesses and any threats regarding the strategic research plan resulting from the SWOT analysis in the prior annual or renewal review site visit report.

The ERCWeb **Table 2**, “Estimated Budgets by Research Thrust and Cluster,” should be inserted at the end of this section. This table is used by reviewers to understand the staffing/funding strategy for the allocation of direct support to center projects and the indirect support derived from associated projects. Table 2 can be used to gauge the level of support in terms of personnel and cash devoted to the different research and technology efforts needed to achieve the Center’s mission. Table 2 includes data on the disciplinary makeup of the team as well as allocation of people and funds to each project receiving direct support and indirect support. It also enables the reviewers to understand the roles of the different institutions in the ERC’s research. The data in Table 2 should be reported in such a way that it aggregates projects devoted to the same goal so that the result shows interdisciplinary teams conducting cluster-level research. It should not show a list that represents the budgetary allocation of funds to individuals. Table 2 shows the current year budgets at the project, cluster, and thrust levels; and the proposed budget at the thrust level only. Proposed growth or reduction in funds will have been justified earlier as discussed above.

The ERCWeb **Figure 2a**, “Research Project Investigators by Discipline,” should also be inserted in this section. This is a disciplinary wheel for the ERC produced by ERCWeb from the information provided in Table 2.

#### *4.5.2.1 ERC’s Research Program (by Thrust and Testbed)*

This section should be organized by research thrust area. Each subsection describing a particular research thrust or testbed should begin with a brief table that shows the names of faculty participants, their institutional and departmental affiliations, and identifies the thrust leader. (This may be the same table as developed for the Participants Tables as described earlier in section 4.3.)

#### ERC Research Program (by Thrust-Testbed) Reporting Requirements

- The construct of the thrusts derives from the strategic plan. For each thrust, the center should present a discussion of how that thrust, through its constituent clusters of projects, and testbeds as appropriate, executes the goals of the ERC. The discussion should include how specific knowledge gaps and barriers guide the selection of the specific research projects and testbeds.
- The narrative should summarize the theoretical and scientific research carried out to provide the needed fundamental knowledge, and should indicate how these achievements contribute to realizing the center’s goals and their broader impacts on knowledge and technology advancement. A state of the art analysis should be provided comparing center

goals with the results from other leading research groups worldwide in similar research areas. Specific project level examples should be given for key projects that serve an integrative role in the thrust so the reviewers can understand both the technical methodologies used and how the project plays an integrative role within the thrust and with another thrust.

- The role of any testbeds within the thrust should be described along with how the research and testbeds contribute to other thrusts and to the ERC's goals for enabling systems technology testbeds.
- Major achievements in transformational and incremental knowledge and technology should be discussed, including technology transferred to industry/practitioners and its impact in those sectors, as appropriate to age of the ERC.
- The specific goals and deliverables of translational research work should also be included in this section.
- The discussion should also include how any associated projects augment the thrust's ability to achieve its goals.
- At the end of each thrust section, include only those references mentioned in the narrative. A complete list of publications published since the last Annual Report should be provided in Volume I as a bibliography at the end of Volume I and grouped by Thrust/Testbed. These are manuscripts published in peer-reviewed print or web journals only and should not include any manuscripts in preparation, under review, or approved but not published.
- For renewal proposals, provide a list of publications over the past three years, in the same fashion as above.
- As for each thrust, for major integrative systems-level testbeds, there should be a separate section. Enabling technology testbeds that reside in a thrust can be reported within that thrust.
- For systems-level integrative testbeds, report on the goals of the testbed and how it supports the systems vision of the center, how the testbed integrates enabling technology to demonstrate system functionality, how the research in the thrusts feeds into the testbed and how testbed results feed back into the thrusts, and the role of the testbed in education.

Response to Previous SWOT: Each thrust's/systems testbed section must include actual (not just planned, and not just a repeat of the response to the site visit report from the previous year), direct actions taken since the last site visit by the ERC in response to major weaknesses and any threats regarding the thrust resulting from the SWOT analysis in the prior annual or renewal review site visit report; in the case of new ERCs, in the pre-award site visit report and subsequent reviews.

ERC Innovation Awards and/or ERC-SBIR Partnership Awards: Centers that have received ERC FY 2009 Innovation Awards and/or ERC-SBIR Translational Research Awards (e.g. SECO awards or subawards from SECO awardees) in a fundamental or technology research area should report on the specific results of that award in the appropriate thrust or testbed subsection. The goals and objectives should be summarized along with the progress made toward achieving those goals. In addition, an appropriate project report in Volume II is required for each award.

#### 4.5.3 University and Pre-college Education Programs

This section should be organized into two sub-sections: one covering the center's university-level education (undergraduate, graduate, postdoctoral, and practitioners) program and another covering the center's pre-college education program.



A matrix that displays the center’s university and pre-college education activities for the lead and partner universities that indicates the involvement of each university in each cell must be provided in this section. An example of a matrix is provided below.

	Course Materials for New and Ongoing Courses	Degree Programs (Not Required)	REU	RET	Young Scholar (Gen-3 Only)	Pre-College	Practitioner Education
Lead Institution							
Partner Univ. 1							
Partner Univ. 2							
Partner Univ. 3							

*Cross-ERC Education Activities*

= In Place   = New This Year,   = Future Year

#### 4.5.3.1 ERC’s University Education Program

For both Gen-2 and Gen-3 ERCs, this section should present the center’s university education strategic plan to produce graduates who are successful leaders in technology advancement in industry. For Gen-3 ERCs, the narrative is augmented by an additional section explaining how the ERC is developing graduates who are creative, adaptive, and innovative engineers who can succeed in a global economy. (Gen-2 ERCs who wish to take on this additional educational role are free to add this dimension to their education program.)

For both Gen-2 and Gen-3 ERCs, this section should focus on the education strategic plan and discuss the following points specifically:

- The desired skills sets and experiences an ERC graduate will need to be effective in industry;
- The structured program of activities designed to achieve those skill sets;
- An assessment program, including quality improvement, designed to determine the education program’s effectiveness in delivering the targeted skill sets including formative and summative assessment plans and results provided as time progresses;
- A plan and results to date for integrating the center’s research activities into the curriculum through new courses, new course materials for ongoing courses;
- A plan and results to date, if applicable (not required), for integrating the center’s research activities into new degree and certificate programs, if proposed;
- A discussion of how the Research Experiences for Undergraduates (REU) students are integrated into center research activities. The discussion should include the level of funding and sources of funding (base budget, university funds, and/or an NSF REU

site award, etc.), and the number of REU students supported during each year of the center.

- A discussion of the academic year undergraduate research program for ERC students and how the students are integrated into the Center's research activities.
- A discussion of the educational goals and impacts of the ERC's alliances with NSF Diversity Awardees, if applicable.
- A discussion of the educational role of any foreign partnerships (Gen-3 ERCs) or faculty-to-faculty foreign collaborations (Gen-3 and Gen-2 ERCs). Information should be provided on how these efforts contribute educational/research value for both domestic and foreign students. Information should be included on the type of experiences the students have, the duration, special impacts on the research they are carrying out, etc.
- Examples of benefits to the students' overall educational experience due to the interdisciplinary and cross-university research/education culture of the ERC should be noted.
- For ERCs with graduates with sufficient ERC experience (e.g. centers in operation three or more years), this section should also include a table of a few (3-5) exemplary graduates of the ERC with information about their course of study, their year of graduation, their current employment, and their contributions to the field.

In addition, for Gen-3 ERCs, the narrative must include a discussion of the following points:

- The desired skill sets and experiences ERC graduates will need to become creative, adaptive and innovative engineers who can succeed in a global economy (the term "desired skill sets" is replacing the "educational hypothesis" term);
- The structured program of activities designed to achieve those skill sets;
- An assessment program designed to determine the education program's effectiveness in developing the targeted skill sets including formative and summative assessment plans and results provided as time progresses along with a strategy for quality improvement.

Response to previous SWOT: This section must include actual (not just planned) direct actions taken since the last site visit by the ERC in response to major weaknesses and any threats regarding the thrust resulting from the SWOT analysis in the prior annual or renewal review site visit report; in the case of new ERCs, in the pre-award site visit report and subsequent reviews.

#### *4.5.3.2 ERC's Pre-College Program*

Gen-2 Pre-College Program Reporting Requirements:

- The center should provide a summary of the pre-college education strategic plan in this subsection including the involvement of pre-college students and teachers. The discussion should include an overview of the development and progress of the pre-college program over the previous three years and plans for the future.
- Successes and challenges of the pre-college education work should be noted along with assessment results or future plans for assessment.
- The center also should provide a discussion of the Research Experiences for Teachers (RET) program including the number of participating teachers during each year of the center, the level and source of funds (base budget, university funds, and/or an NSF RET site award,

etc.), and the impacts of the RET program on inserting engineering concepts into the pre-college curriculum.

Gen-3 ERCs Pre-College Reporting Requirements:

- The center should present the strategic plan for long-term partnerships in pre-college education with partner middle and high schools. The narrative should include a discussion of the goals, activities and expected impacts on the inclusion of engineering concepts in pre-college classrooms through involvement of teachers and students in the ERC's pre-college program.
- The center's RET program and Young Scholars Program should also be discussed. The discussion of the Research Experiences for Teachers program should include the number of participating teachers during each year of the center, the level and source of funds (base budget, university funds, and/or an NSF RET site award, etc.), and the nature of teacher activities, including research projects, follow-on plans, and the impacts of RET program on inserting engineering concepts into the pre-college curriculum.
- For the Young Scholars Program, the discussion should include the number of participants and the research topics being addressed.
- The narrative should also include information about the current domestic partner universities' faculty and student involvement in the pre-college program and plans for developing and expanding participation through time to impact all the partner domestic universities.
- The formative and summative assessment plans should be discussed and results provided as time progresses. This is necessary to gauge the impact of the program on the inclusion of engineering concepts in the pre-college classroom and on stimulating pre-college students to choose engineering as an educational major at the community college or university level.

Response to previous SWOT: This section must include actual (not just planned) direct actions taken since the last site visit by the ERC in response to major weaknesses and any threats regarding the thrust resulting from the SWOT analysis in the prior annual or renewal review site visit report; in the case of new ERCs, in the pre-award site visit report and subsequent reviews.

All ERCs: The ERCWeb **Table 3a**, "Educational Impact," and the ERCWeb **Table 3b** "Ratio of Graduates to Undergraduates," should be inserted in this section. **Table 3b**, "Ratio of Graduates to Undergraduates," will show both non-REU undergraduates and REU students, taken from Table 7 data. The center will strive for a Graduate to Undergraduate (non-REU students) ratio of 2 or less of Center funded students by Year 3 (*note*: the ratio in Table 3b is calculated using all Center non-ERC students, including those funded by associated projects). If the academic year ratio is significantly more than 2, the center should explain steps being taken to increase the participation of undergraduates in center research during the academic year.

4.5.4 Industrial/Practitioner Collaboration and Technology Transfer (For Gen-3, Industrial Collaboration and Innovation Ecosystem)

In this section, the center should discuss the industrial/practitioner collaboration and technology transfer/innovation portion of its strategic plan. This narrative should summarize results from the previous three years (fewer if the center is less than three years old) with more detail for the last year regarding industrial/practitioner collaborations and partnerships and plans for the future. Industry/Practitioner members are defined as those who have provided membership fees to the center, to be used at the discretion of the center director, in the form of cash or in-kind support according to the center's membership agreement. Industrial firms or practitioner organizations

that only provide associated or sponsored project support are not considered members under the cooperative agreement terms.

The narrative should contain information on the following topics as described below: (i) vision goals and strategy; (ii) membership and intellectual property policy; (iii) position of member firms in the ERC's industry "value chain;" (iv) technology transfer and translational research; (v) innovation and new business development; (vi) future plans, and (vii) response to most recent site visit SWOT analysis.

#### 4.5.4.1 *Vision, Goals, and Strategy*

The Center should present the vision and goals of the industrial/practitioner program including membership goals, technology transfer goals, and innovation goals if appropriate (required for Gen-3 Centers). This should also include the strategies the Center is pursuing to achieve its goals.

#### 4.5.4.2 *Membership*

In the area of membership, both Gen-2 and Gen-3 ERCs should indicate their target goals for membership in terms number of firms, composition of firms of different sizes (e.g. percentages of large corporate, medium firm, small or startup) and cite the strategy for developing their industrial membership in light of the ERC's industry value chain. The center should include an identification of the relevant industry sectors that are targeted for participation by members in light of current members and missing types of firms, given that value chain. Once this is established, the ERC's strategy for developing and strengthening its membership should be discussed. For example, defining the avenues of communication used to keep industry members engaged in the Center, the frequency of contact, and the nature of contact (i.e. advisory to ERC or dissemination of information from the ERC).

The membership discussion also should include the following information:

- A summary of the tiered membership structure of the ERC and the membership rights accorded at each level (the full cross-university membership agreement and cross-university IP policy will be provided in Appendix II);
- A summary of the policy for handling ERC-generated IP;
- A description of the roles of the members, the Industry Advisory Board, other industry boards or focus groups and/or stakeholders;
- A summary and discussion of trends of Industrial/Practitioner Membership and Support by Year, supported by the following ERCWeb tables and figures: **Table 4**, "Industrial/Practitioner Members, Innovation Partners, Funders of Sponsored Projects, Funders of Associated Projects and Contributing Organizations," **Table 4a**, "Organization Involvement in Innovation and Entrepreneurship Activities (Gen-2) Innovation Partner Involvement/Activities," (**Gen-3 only**) **Table 5**, "Innovation Ecosystem Partners and Support by Year" **Table 5a**, "Technology Transfer Activities," **Figure 5b**, "Lifetime Industrial/Practitioner Membership History," and **Figure 5c**, "Total Number of Industrial/Practitioner Members," and **Figure 5d**, "Industrial/Practitioner Member Support, by Year."
- An illustration of the member firm involvement along the ERC's industry value chain.

#### 4.5.4.3 Technology Transfer

In the area of technology transfer, the center should discuss the strategy to move ERC-developed technologies to the market and progress and results to date. To facilitate this discussion, the center should create two tables and one chart, described as follows.

First, a table of all patents and licenses derived from the ERC’s research over the lifetime of the center, including their titles and numbers, should be included. An example is shown below.

IP License Number or Name	IP License Title or Name	IP Category: FP, PP, C, T	Brief Description of Technology	Owner of IP	Year Awarded

FP= full patent; PP = provisional patent; C= copyright; T= trademark

*ERC Intellectual Property Table, to be created by the Center*

Second, a table should be created by the center entitled “Technology Transfer” with the format shown below that includes technology used by both established firms and start-up firms. All technologies transferred from the center to industry and other users over the life of the center and their impacts should be inserted in this table. The discussion regarding this table should include information specifically about market impact or the benefits to society of the technologies that have been transferred. To the extent that industry is willing to release the information, quantified examples, such as productivity gains in terms of man-hours saved or production costs in terms of dollars saved, or financial and other market impacts should be provided in the table.

Adopting Company	Technology	Industrial Application		Impact (e.g., cost savings; productivity gain, financial and other market impact etc.)
		When transferred (date)	Use in Company	

*Technology Transfer Table*

Finally, the Center should create the Technology Transfer Chart (see figure below) to depict major technologies or methodologies that the ERC expects industry/practitioners to adopt over the 10-year time frame of NSF support. The technology transfer chart is a qualitative chart that plots the maturity level of a particular technology or methodology on the x-axis and the expected type of impact of the technology or methodology on the y-axis. The technology maturity level range is from “idea stage” to “technology transferred to industry” (this is similar to the NASA Technology Readiness Level, TRL, scale, see [http://esto.nasa.gov/files/TRL\\_definitions.pdf](http://esto.nasa.gov/files/TRL_definitions.pdf) and the technology impact range is from “incremental impact” to “breakthrough technology.” The center should place a marker on the chart for each major technology or methodology expected to be transferred, and include a brief description of the technology or methodology in the narrative or refer the reader to the appropriate Project Summary reference in Volume II.

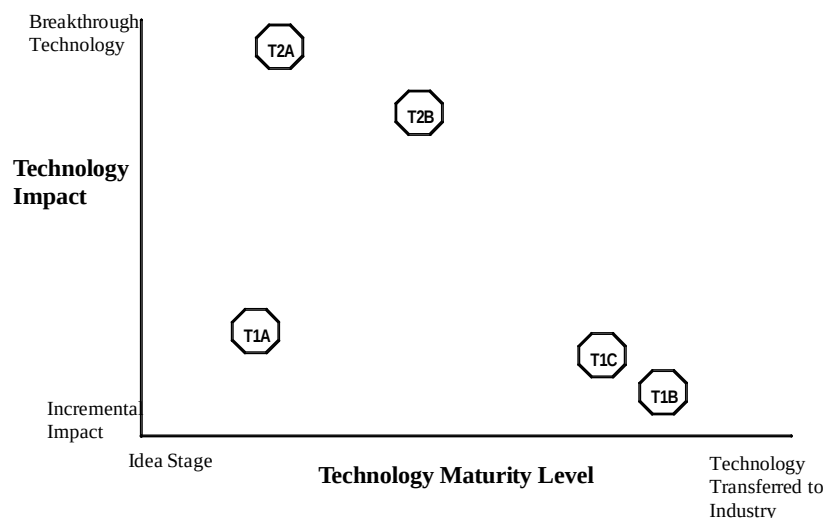


Figure 4.5.4.1: Technology Transfer Chart Example (T1A=Thrust 1, Project A, etc)

#### 4.5.4.4 Innovation

Innovation activities are required of Gen-3 Centers and often Gen-2 Centers also have activities in this area and should report on them in this section. Some examples of innovation activities include events that educate center personnel about entrepreneurship or technology transfer, events that link researchers with industrial users or potential investors, formation of start-up firms, discussion of associated SECO, Advancing Innovation Research (AIR) or Innovation Corp (I-Corps) awards.

One requirement of Gen-3 ERCs is the development of a culture that links discovery to innovation (e.g. an innovation ecosystem) to achieve the Center’s vision and this section should describe the Center’s strategy for developing such an ecosystem. The concept of the innovation ecosystem stresses that the flow of technology and information among people, enterprises, and institutions is key to an innovative process. It contains the interaction between the entities that are needed in order to turn an idea into a process, product, or service for the market. In this context, the entities will include state and local governments, and university or other organizations devoted to entrepreneurship and innovation (e.g. the innovation partners) and may include the IAB. The intent of such an ecosystem is to speed the translation of ERC developed knowledge into innovation and then to the market; and if developed properly, should continue to support the Center’s vision after graduation. This discussion should include the following points (when applicable):

- The strategy for translational research by engaging IAB members in translational research through sponsored projects; and, if member firms fail to license new IP, working with non-member firms who license the IP with the intent of developing and translating Center generated innovations. The non-member firms can proceed with development by seeking support for translational research from the ERC Program’s Translational Research Fund (the SECO solicitation), with a subaward to the ERC;
- The strategy for developing the people (undergraduate and graduate students, post docs, or faculty) who take on the role of championing<sup>1</sup> the innovations to be translated;

<sup>1</sup> Champion—the person who takes on the responsibility of championing an innovation through the translation process to insure that it will be commercialized. Often, the champion is not the same person as the inventor.

- The strategy for speeding technology translation, entrepreneurship, and innovation through the establishment of formal partnerships with state and local government, university, or other organizations devoted to entrepreneurship and innovation;
- The strategy for deciding when it is appropriate to launch new firms and a description of the process for launching them should also be discussed in detail here, and should be consistent with NSF’s translational research guidelines and governed by the university’s conflict of interest management policies;
- The communications strategy for insuring that all ERC team members are aware of the technology translation processes available to them;
- The identification of any critical tools or other resources that are specifically developed within the innovation ecosystem nexus to help speed the translation of ERC developed innovations to the market (e.g. testbeds, incubators, etc.);
- The discussion should include any activity by advisory boards or focus groups that has a particularly high impact on the innovation capability of the ERC (e.g. technology roadmap development).
- The narrative should indicate any concrete accomplishments and impacts that specifically enhanced the ERC’s innovation ecosystem and its impacts during the prior year.

One aspect of innovation is the creation of new businesses. **Both Gen-2 and Gen-3 Centers** should create a table entitled “ERC Start-Up Firms.” This table should show all start-up companies that have spun-off based on ERC research. In addition to the table, the narrative text within this section should include more detailed information about start-up firms based on ERC research such as growth since inception, number of employees, funding and sales. An example of the table is shown below.

Name of Firm	Contact Information at Firm	Date Established	Name of Principle & Relationship to ERC (e.g. faculty, student, graduate, if any)	Funding status (SBIR, 1 <sup>st</sup> round, positive tax income, etc.)	Technology	Market Impact or Societal Benefit (in terms of value added)

*ERC Start-Up Firms Table, to be created by the center.*

Volume I, Appendix 2 must include a description of the ERC’s and lead university’s Conflict of Interest (COI) policies regarding start-up firms where members of the ERC Leadership team, ERC faculty or others supported by the ERC are involved in the firms. See Section 4.5.5.3 for the specific requirements, and Section 4.9.2(6) for the specific requirements.

**Both Gen-2 and Gen-3 Centers** should discuss any partnerships that were formed in the prior year, or are under negotiation, for the purpose of translating ERC technology; this will include sponsored projects, ERC-SBIR funded collaborations (SECO), and other NSF-funded translational research partnerships. Specific activities initiated with innovation partners or the initiation of a formal program that encourages teaming between the ERC participants and a business school to develop innovation should also be reported here. A table in the format shown below should be used to summarize the technology translation innovation proposals that ERC personnel submitted or won during the award year, with a status column indicating awarded, declined, or pending. For awarded proposals, the center should create a second table,

Translational Research Partners Table, which additionally shows the partner(s), funding level and sources. Results from these collaborations, such as the impact on new product development, should be reported in the narrative.

Proposal #	Innovation Proposal Title	Status

*Technology Translation Innovation Proposals Submitted by the Center*

Translational Research Partner Firm	Project Title	Funding Level	Funding Sources

*Translational Research Partners Table, created by the Center*

#### 4.5.4.5 Future Plans

The Center should discuss future planned actions and activities for the upcoming year(s) to further progress to their stated industry/practitioner, technology transfer, and innovation goals.

Response to prior year SWOT: Finally, the Center must include actual (not just planned) direct actions taken by the ERC in response to major weaknesses and any threats regarding industrial collaboration and technology transfer resulting from the SWOT analyses prepared by the IAB and in the prior annual or renewal review site visit report. For new ERCs this section should update the reviewer on progress in response to the pre-award site visit report and subsequent reviews of the ERC.

#### 4.5.5 Infrastructure

This section should provide the reader with information on the institutional configuration of the ERC; its team and their diversity; organization and management; sources of and deployment of financial resources; facilities and equipment; university commitment to the ERC’s vision, goals, strategic plan; and sustainability plan for ERCs in their fifth year and beyond. The four subsections of this section match the four subsections of the ERC performance review evaluation criteria under the Infrastructure heading.

There are several required ERCWeb tables that should be included in this section. Additionally, the ERCs are encouraged to use any extra figures, tables, charts, pictures, etc. to communicate useful quantitative information. Analyses of the data and trends in the data should be presented in the narrative at the point where the corresponding table or figure is presented.

Response to prior SWOT: In addition, included in this section must be direct actions taken by the ERC in response to major weaknesses and any threats regarding the resource planning and



management resulting from the SWOT analysis in the prior annual or renewal review site visit report. For new centers, this section should update the reviewers on major infrastructure changes resulting from the pre-award site visit report and subsequent reviews.

#### 4.5.5.1 *Configuration and Leadership Effort*

Given the ERC's vision and goals, the institutional configuration and its rationale should be justified. For Gen-3 ERCs, this section would include the rationale for the cross-university configuration and the major value added by each partner in terms of research capacity, fields needed to address the research and/or education goals of the ERC, etc.. The disciplinary configuration of the team, significant changes, and plans for hiring key personnel should be included.

The ERCWeb **Table 6**, "Institutions Executing the ERC's Research, Technology Transfer, and Education Program," should be inserted in this section. The roles of the different types of organizations listed in Table 6 should be explained. Changes since the last Annual Report or pre-award review should be noted. A description of collaborations with other ERCs or other centers not previously mentioned should be included. This includes both those funded by center funds and those collaborations that do not involve any transfer of funds across centers.

**Figure 6a**, "Domestic Location of Lead, Partner, Collaborating, and REU and RET Participants' Institutions" and **Figure 6b**, "Location of Foreign Collaborating Participants' Institutions" (for Gen-2), and "Location of Foreign Collaborating Participants and/or Foreign Partner Institutions" (for Gen-3 ERCs) should be inserted in this section. These figures show maps of lead, core partner and institutions contributing collaborating faculty (both foreign and domestic), and institutions of REU and RET participants. Figures 6a and 6b cannot be produced automatically by the ERCWeb system but will be produced on your behalf by the database contractor, ICF Macro. Please email them at support@erc-reports.org once you have marked the "Organizations and Institutions" tab complete and they will produce these maps for you. **Figure 6c**, Country of Citizenship for ERC Foreign Personnel (foreign nationals who are classified as ERC students or faculty) will also be produced by ICF Macro in a fashion similar to 6a and 6b and should be inserted in this section. Figure 6c will show a world map with the countries of citizenship of these foreign nationals marked. Allow six business days for ICF produced maps (note, this may impact the timeline discussed on page 8). **A center may also produce Figures 6a, 6b, and 6c locally if preferred.**

Describe the leadership team and the expertise of the leaders relevant to the goals of the ERC. The role of the leadership team in developing and implementing the center's various strategic plans, as well as making major decisions, should be presented.

#### 4.5.5.2 *Diversity Effort and Impact*

The ERC will report on the diversity strategic plan, executed in collaboration with the chairs of the departments and deans of the schools providing the ERC's faculty.

This section will present a summary of the ERC's diversity strategic plan and progress in the past year in relation to the milestones in the diversity plan. The discussion should include key successes and deficiencies/challenges identified in the previous year's plan and new strategies to rectify them. **(The complete diversity strategic plan should be inserted in Appendix IV in**

**Volume I.)** The discussion also will include information on the success or failures of the ERC in creating a climate of inclusion, where members of the leadership team, faculty and students from all backgrounds have an opportunity to succeed in research, education, innovation, and/or leadership. The ERC’s diversity plan should include the center’s diversity goals and tactics used to increase diversity, and report quantitatively on results benchmarked against engineering wide academic averages. Plans are not allowed to have quantitative targets according to guidance from the NSF Office of the General Counsel. The plans will include the partnership between the ERC and its supporting Deans and Department Chairs to increase diversity at all levels. It should be noted that in FY 2007, the cooperative agreements of ERCs were revised to assure inclusion of persons with disabilities within the ERCs’ diversity strategic plans. Therefore, the centers should be sure to address the current involvement and the plans to increase the involvement of persons with disabilities in their ERCs.

The role of the education program in the overall center’s diversity plan should also be discussed in this section.

ERCWeb **Table 7**, “ERC Personnel”, should appear in **Appendix III** of Volume I and not in this section. However, the summary table and figures, Tables 7a and 7f and Figures 7b through 7e, should be presented in this section.

ERCWeb **Table 7a**, “Diversity Statistics for ERC Faculty and Students” should be inserted in this section. It will show the diversity statistics at the center level for women, underrepresented racial minorities, Hispanics/Latinos, and persons with disabilities for the leadership team, faculty, doctoral students, master’s students and undergraduate students. There will be two sections of this table: one for U.S. citizens and permanent residents only and the other for foreign nationals.

Next, four figures produced by ERCWeb should be inserted that represent the information of Table 7a in a bar chart format. These are ERCWeb **Figure 7b**, “Women in the ERC,” ERCWeb **Figure 7c**, “Underrepresented Racial Minorities in the ERC,” ERCWeb **Figure 7d**, “Hispanics/Latinos in the ERC,” and **Figure 7e**, “Persons with Disabilities in the ERC.”

Finally, the ERCWeb **Table 7f**, “Center Diversity, by Institution” should be inserted.

#### 4.5.5.3 *Management Effort*

The organization and management system of the ERC should be discussed and an organizational chart presented. The Center is reminded that the Center Director must report to the Dean of Engineering.

#### Management System Reporting Requirements

- The roles of its advisory boards and the role of the Student Leadership Council in providing strategic and operational guidance should be explained.
- This section should also include discussion of the ERC’s methods for: (1) determining which projects are needed to achieve the center’s strategic plan; (2) determining funding allocation to implement the strategic plan; (3) assessing the quality and impacts of the projects; (4) the role of the Scientific Advisory Board and the IAB in project review and assessment, (5) identifying associated projects awarded to center faculty members’ departments that are needed by the center to achieve the strategic plan; (6) forming the research team, including the role of faculty/staff from partner and collaboration

institutions in research and education; (7) integrating the REU and RET Programs into the research program;

- The role of mentoring in the ERC including a description of the mentoring activities for pre-college participants, undergraduate and graduate ERC students, any postdoctoral researcher that is currently or will be supported by the Center, and young faculty. Note that the statement of mentoring activities for postdoctoral researchers is required in annual reports and renewal proposals. In addition, it is extremely important in any renewal proposal because the proposal will be returned without review if the Center shows a budget for postdoctoral researchers but does not have a statement of mentoring activities. Likewise, in the Annual Report, if the Center has shown support for a postdoctoral researcher over the reporting period, a statement of mentoring activities must be provided or the Annual Report will be returned for correction. This is NSF policy in accordance with the America COMPETES Act.

#### Financial Support Reporting Requirements

- Describe the financial management system of the ERC -- its financial support, budget allocation, expenditure and fiscal planning systems. The required tables below will be used as a basis for an analytical discussion of trends in financial support and budget allocations and the reasoning behind them.
- Information on major sources of cash and in-kind support such as facilities, buildings or shared equipment should be provided. Major expenditures in the past year (three years if this is a renewal proposal) that are not discussed elsewhere in the Annual Report should be discussed here.
- Additional charts, tables or figures may be added if the ERC feels it is necessary to present the full financial picture of the center.
- Growth requested in the proposed budget for the following year/three years should be briefly justified with a reference to the appropriate earlier sections of the Annual Report/Renewal proposal that contain the more detailed explanation of activities to be funded by the requested growth.

#### Conflict of Interest Reporting Requirements

- In addition to the university policy Conflict of Interest (COI) information to be included in the Appendix (see 4.9.2 (6)), the Center should provide specific information about the policies and procedures the ERC follows regarding potential COI situations between ERC faculty and his or her firm(s) and the source of these policies and procedures (e.g. internally developed or from the lead university). Faculty who are in ERC leadership positions, and therefore are responsible for allocations of ERC funds, may be in the position of making decisions that could financially impact their firm(s). For example, a certain decision may result in support of their firms' projects, or result in sole source purchases from their firm(s). Conversely, a decision might result in unjustified exclusion of projects or products from competing firms. The Center should provide a description of how this type of situation would be handled. For example, a member of the ERC leadership team who is involved with a start-up firm could recuse him- or herself from a funding decision which might be beneficial (or detrimental) to his or her firm(s). The Center should have a formal oversight process in place to handle these types of situations.

#### Strategic Self-Sufficiency Business Plan Reporting Requirements

- Starting in the fifth year, the Annual Report and sixth-year Renewal Proposal must include a strategic business plan for self-sufficiency as a subsection of this section, which is up to five pages in length. If the full strategic business plan exceeds five pages, it may be added as an Appendix and a five page (maximum) synopsis of the plan should be placed here. It will include the envisioned features of the post-graduation ERC, cost and income projections, plans for gaining sources of support and plans for expenditures. Cost projections will include support for planned core staff, such as the AD, ILO, and/or Education Director. This plan will be updated in the 6<sup>th</sup> year renewal proposal and in each subsequent Annual Report. .
- Centers in years eight and nine in which a change in the center’s configuration upon graduation is under consideration or already decided should describe the reconfiguration plans and provide an explanation of the changes.
- All centers should discuss their strategy and any actions associated with obtaining increased support from industry and other sources after the ERC Program funds cease. Also, the long-term commitments from lead and core partner institutions to help ensure the continuation of the Center’s administrative, industrial, and education components and retention of the research and office space should be presented.

The following tables should be inserted and discussed:

ERCWeb **Table 8a**, “Current Award Year Functional Budget.” should be presented in this section. Table 8a should cover Current Award Year data only.

**Table 8b**, “Allocation of Current Award Year Budget, by Institution, FY 2013,” should be developed and presented by the center (it is not an ERCWeb table) according to the format shown below. This table shows the portion of direct cash (unrestricted and restricted) and associated project support in the current year budget by institution. This includes the lead, core partner(s), and, collectively, all other institutions reported in Table 6 receiving direct center cash and associated project support.

Institutional Distribution of Current Award Year Budget					
Institution	Direct Cash	Associated Projects	Total Cash and Associated Projects	Percent of Total Direct Cash	Percent of Total Associated Projects
Lead					
Core Partner 1					
Core Partner 2					
etc.					
All Other Institutions					
Grand Total					

*Sample Table 8b Portion of Current Award Year Budget, by Institution, FY 2013, to be created by the center*

**Table 8c**, “Education Functional Budget,” is an ERCWeb table and should be inserted here by the center. In Table 8c, the REU and RET budgets are shown separately from the rest of the Research and Education and Outreach program. As a minimum, each ERC is expected to budget \$42,000 annually for an RET site and \$42,000 annually for an REU site for FY 2013, not including overhead.

ERCWeb **Table 9**, “Sources of Support”, should be presented next. For Gen-3 ERCs, the amount of money contributed to the center’s mission from the foreign university partners should be displayed in the appropriate “foreign university” row. For example, projects conducted at the foreign university that support the ERC should be reported as associated projects funded by a foreign university. As such, they should also be reported in Volume 2, see Sections 5.3 and 5.4.

**Table 9a**, “History of ERC Funding of the Center,” should be developed and presented by the center (it is not an ERCWeb table) according to the format shown below. This table chronologically lists every separate award from the ERC Program: base award, each increment, renewal award, and supplement (e.g., REU, RET, diversity program support, etc., Graduate Research Supplement (GRS) Award, ERC/SBIR Translational Research Award), and special purpose awards (e.g. connectivity, equipment, Innovation etc.) In addition, this table should also include the NSF RET and NSF REU site awards that have been made to the center outside of the ERC Program. (Starting in FY 2007 the RET and REU awards were not made through the ERC Program, rather they were awarded as part of a broader solicitation; and if the ERC received one of these site awards, they should be included in the table.)

Search for this information on [Fastlane](https://www.fastlane.nsf.gov/)\Award and Reporting Functions\View/Print Award Documents\Active Awards. <https://www.fastlane.nsf.gov/>

Award Number	Award Type	Award Title	Award Duration	Amount	Status	Final Report Approved?
	Base	Center for Widget Systems Research	5 years	\$18,500,000	In progress	N/A
	REU Site Award	Building Widget Systems	3 years	\$350,000	Completed	Yes
Total				\$XX,XXX,XXX		

*Sample Table 9a History of ERC Program, REU and RET Site Funding of the Center, to be created by the center*

For Gen-2 ERCs, the Iowa State University Gen-3 ERC, and the Gen-3 ERC Classes of 2011 and beyond **Table 9b**, “Cost Sharing by Institution,” should be developed and presented (it is not an ERCWeb table) according to the format shown below to include each year of the center. Table 9b and the university cost sharing amount placed on line M of the NSF budget form (NSF form 1030) in the Budget Request section should reflect the center’s university cost sharing requirements specified in the center’s cooperative agreement. The purpose of this table is to show the committed cost sharing, based on the original proposal or the last renewal proposal and the cooperative agreement, for the lead and core partner institutions for the current year and all prior years of operation. The cost sharing commitment does not apply to non-partner institutions, RET/REU supplements or other special awards funded by the ERC Program, but it does apply to other supplements and the 2007 growth supplements provided to the Class of 2006. All cost sharing must be provided from non-Federal sources, including both university and non-university sources. If the projected annual university cost sharing has not been met, a plan should be provided that explains how it will be met by the end of the current award period. For Gen-2 ERCs, the Iowa State University Gen-3 ERC, the Gen-3 Classes of 2011 and beyond, a certified copy of Table 9b must also be submitted in Appendix II. For more information, the cost sharing reporting terms in the present cooperative agreement template should be consulted along with the NSF requirements in the [Proposal and Award Policies and Procedures Guide](#).

**Renewal Proposals.** (Centers in Year 3 or Year 6), For Gen-2 ERCs, the Iowa State University Gen-3 ERC, and the Gen-3 ERC Classes of 2011 and beyond, Table 9b should be extended to show the proposed university cost-sharing commitments for the extension of the support requested. Thus for a third-year renewal, the cost sharing table would be extended to show the proposed university cost-sharing commitments through year 8, and for a sixth year renewal, the cost sharing table would be extended through year 10.

Institution	Award Year 1...		... Current Award Yr		Cumulative Amount Transferred to ERC Account
	Committed	Amount transferred to ERC Account	Committed	Amount transferred to ERC Account (to date)	
Lead University					
Core Partner #1					
Core Partner #2					
...					
<b>TOTAL</b>					

*Sample Table 9b Cost Sharing by Institution, to be prepared by the center*

All Gen-3 ERCs with university level foreign partnerships, governed by a formalized partnership agreement between the ERC and the university, need to create another funding table, Table 9c, “Funding by International Partner Universities” to show the amount of funding provided by the foreign university partner institutions toward the foreign institution’s projects that are directly contributing to the Center’s strategic plan, as well as faculty and students involvement.. An example is shown below.

International Partner University	Foreign Funding Entity	Current Award Year Foreign Funding	Type of Activity	Number of ERC Foreign Faculty (FF) and ERC Faculty (ERCF)	Number of U.S. ERC Students Working in Foreign Research Labs for more than 30 days	Number of Foreign Students Working in ERC Lab for more than 30 days
		Rec'd				
Helsinki University of Technology	Finnish Government	US \$250,000	Student Exp.	3 (FF) 2 (ERCF)	6	
Hannover Medical School	German Government	US \$20,000	Research	1 (FF) 5 (ERCF)	5	

*Sample Table 9c: International Partner Universities--Funding and Collaboration Activities*

Gen-2 and Gen-3 ERCs with faculty-to-faculty foreign collaborations (as opposed to a formal ERC-university agreement) need to create another funding table, Table 9d, as shown below.

Foreign University	Type of Activity	Number of ERC Foreign	Number of U.S. ERC	Number of Foreign
--------------------	------------------	-----------------------	--------------------	-------------------

		Faculty (FF) and ERC Faculty (ERCF)-	Students Involved in Foreign Research Labs for more than 30 days	Students Working in ERC Lab for more than 30 days

Sample Table 9d Collaboration Activities with International Partner Universities

ERCWeb **Table 10**, “Annual Expenditures and Budgets,” and ERCWeb **Table 11**, “Modes of Support by Industry and Other Practitioner Organizations to the Center,” should be presented next. Table 10 includes budgets and expenditures for "restricted and unrestricted" (i.e. NSF, costshare, industry, donations, etc.) An analysis of these tables should be provided in the narrative that discusses their implications for the financial health of the ERC, especially for centers in their sixth year or later as they plan for graduation.

**Table 10a**, “Unexpended Residual in the Current Award and Proposed Award Year,” should be developed and presented by the center (it is not an ERCWeb table) according to the format shown below. This table presents information regarding unexpended (residual) funds that were moved into the current award year at the end of the preceding award year. In the event that the center is planning to move residual cash at the end of the current award year into the proposed award year, the center should distinguish between (1) residual funds that are committed, encumbered, or obligated for specific uses from (2) residual funds for which the center has no plans. The current year spending plans for the residual funds moved into the current year at the end of the preceding year shown in Tables 8, 9, and 10 should be discussed in the narrative. A certified copy of Table 10a must also be submitted in Appendix II.

	Previous Award Year to Current Award Year	Current Award Year to Proposed Award Year
Total Unexpended Residual Funds		
Committed, Encumbered, Obligated Funds		
Residual Funds Without Specified Use		

Sample Table 10a: Unexpended Residual in the Current Award and Proposed Award Year

#### 4.5.5.4 Resources and University Commitment

The headquarters space, its facilities for research and collaboration, and its proximity to the lead institution’s ERC research space should be described. Communications equipment to facilitate cross-campus communication should be presented. A discussion of how the lead university and the core partner universities support the ERC’s interdisciplinary, team culture should be presented. This should include a description of factors considered for tenure; for example, how the center encourages and supports young investigators in interdisciplinary research in light of concerns about how tenure and promotion committees view it.

In addition, in this section the center must discuss training and laboratory procedures that have been implemented to ensure the safety of the students, faculty, and staff working in the ERC labs.

Gen-3 ERC specific: This section should include information on how the participating partner universities are rewarding faculty and students for their efforts in mentoring university faculty, students, and postdocs, and pre-college students and teachers. ERC cross-university partnership agreements facilitating collaboration in research and education also will be explained.

#### **4.6 References**

In this section of the Annual Report, the source for any citations should be listed. The center may choose the exact formatting of the references.

#### **4.7 Bibliography of Publications**

A bibliography of center publications should be included, grouped by Thrust/Testbed. These must be complete listings that include only publications in print at the time of submission of the report and do not include manuscripts in preparation, in review, awaiting publication, or previously reported in an Annual Report, except for Renewal Proposals. Renewal proposals should include a bibliography that covers the previous three years. Education publications should also be included.

#### **4.8 Budget Requests**

In this section, the Summary Proposal Budget, provided on the official NSF budget form 1030 available in FastLane, is required. For an Annual Report, the budget request is required for the following Award year. Growth along the prescribed trajectory up to \$4.0M must be justified in the appropriate section of the Annual Report by explaining how the additional funds will be used and how they would benefit the strategic plan and the center overall. Any NSF forward funding received in the prior award year must be deducted from the subsequent annual budget request.

All classes of ERCs begin at the base level of support provided for year one. The projected level of annual growth that may be requested is \$250,000 until the annual level of support is \$4,000,000. Once that limit is reached, assuming successful 3<sup>rd</sup> and 6<sup>th</sup> year reviews, funding is flat until the base support is reduced by 33 percent in both years 9 and 10. Thus, the budget request for year 9 will be 67% of year 8 and the budget request for year 10 will be 67% of year 9. These are budget requests; the actual level of support will depend upon performance and availability of funds. If a center's annual performance fails to warrant the annual growth, it probably will not be made up as performance improves, thus an ERC on trajectory to achieve \$4.0M in year 4 might not achieve that level of support until year 5. As stated in the previous paragraph, plans for expending the growth funds must be discussed.

Except for the third year renewal proposal, the annual budget request will be submitted into Fastlane each year as a *supplement* request at the same time the Annual Report is due. This is necessary to properly process the budget requests, given the NSF systems. All budget requests also will include the subaward budgets, which must be submitted each year in the annual budget request along with justification from the subawardees. See Table 6.2.1 ERC Renewal and



Increment Submission Protocol for further information. Also see the sample NSF form 1030 at the end of this section.

Cost Sharing for Gen-2 ERC's, the Iowa State Gen-3 ERC's, the Class of 2011 Gen-3 ERCs, and the Class of 2012 NERCs: For awards where the cost sharing amount reflected on Line M of the cumulative award budget is \$500,000 or more, it is the awardee's obligation to submit annual and final cost sharing notifications via FastLane, even if no cost sharing was provided during that particular reporting period. Such notifications must be submitted within 90 days prior to the end of the current budget period to meet the annual notification requirement and within 90 days following the expiration of the award to meet the final notification requirement. The cost share notification is considered due during the 90 day period. The notification becomes overdue the day after the 90 day period ends.

Failure by the awardee to comply with the requirement to submit an annual or final cost share notification will impact the processing of any incremental or supplemental funding action. It also will impact the ability of program staff to process, for final action, any of the PI's or Co-PI's new or renewal funding projects until the necessary notification has been submitted. Due and overdue reminder e-notices for annual and final cost share notifications are automatically sent to Sponsored Projects Offices, thus helping to ensure timely submission.

Cost sharing during year 3 and 6 renewals must be reported in Block M of the *first* budget year of the renewal (year 4 and year 7) and must be the *cumulative* amount of all requested years. (3<sup>rd</sup> year renewals will include years 4-8 and 6<sup>th</sup> year renewal will include years 7-10.)

**Renewal Proposals.** An NSF Budget Form 1030 is required for each of the years of support requested along with a summary of the total support requested (years four through eight for a third-year renewal and years seven through ten for a sixth-year renewal). FastLane will calculate the summary or cumulative budget. All annual subawardee budgets must be provided, regardless of size, and all budgets must be signed by the AOR at each institution. For sixth-year renewal proposals, the request for the last two years of support should reflect a phased down level at the rate of 67 percent of the prior year. The actual level of phased-down support will depend upon performance and availability of funds.

**SUMMARY PROPOSAL BUDGET YEAR 1**

ORGANIZATION				FOR NSF USE ONLY				
[REDACTED]				PROPOSAL NO.	DURATION (months)			
					Proposed	Granted		
PRINCIPAL INVESTIGATOR / PROJECT DIRECTOR				AWARD NO.				
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title, A.7. show number in brackets)				NSF Funded Person-Months			Funds Requested By proposer	Funds granted by NSF (if different)
				CAL	ACAD	SUMR		
1.	[REDACTED]	0.00	0.00	1.00	\$	13,552		
2.	[REDACTED]	0.00	0.00	0.30		5,065		
3.	[REDACTED]	1.00	0.00	0.00		5,191		
4.	[REDACTED]	0.00	0.00	0.50		8,364		
5.	[REDACTED]	0.00	0.00	1.00		16,085		
6.	( 4 ) OTHERS (LIST INDIVIDUALLY ON BUDGET JUSTIFICATION PAGE)	0.00	1.80	3.50		84,798		
7.	( 9 ) TOTAL SENIOR PERSONNEL (1 - 6)	1.00	1.80	6.30		113,055		
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)								
1.	( 3 ) POST DOCTORAL SCHOLARS	36.00	0.00	0.00		120,000		
2.	( 4 ) OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)	45.00	0.00	0.00		178,750		
3.	( 13 ) GRADUATE STUDENTS					269,600		
4.	( 5 ) UNDERGRADUATE STUDENTS					2,500		
5.	( 0 ) SECRETARIAL - CLERICAL (IF CHARGED DIRECTLY)					0		
6.	( 1 ) OTHER					69,843		
TOTAL SALARIES AND WAGES (A + B)						763,748		
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)						166,844		
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A + B + C)						920,592		
D. EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$5,000.)								
TOTAL EQUIPMENT						0		
E. TRAVEL								
1. DOMESTIC (INCL. CANADA, MEXICO AND U.S. POSSESSIONS)						46,000		
2. FOREIGN						12,000		
F. PARTICIPANT SUPPORT COSTS								
1.	STIPENDS \$ 38,000							
2.	TRAVEL 0							
3.	SUBSISTENCE 8,106							
4.	OTHER 7,000							
TOTAL NUMBER OF PARTICIPANTS ( 10 )				TOTAL PARTICIPANT COSTS		53,106		
G. OTHER DIRECT COSTS								
1. MATERIALS AND SUPPLIES						87,000		
2. PUBLICATION COSTS/DOCUMENTATION/DISSEMINATION						0		
3. CONSULTANT SERVICES						5,000		
4. COMPUTER SERVICES						0		
5. SUBAWARDS						1,348,129		
6. OTHER						171,521		
TOTAL OTHER DIRECT COSTS						1,611,650		
H. TOTAL DIRECT COSTS (A THROUGH G)						2,643,348		
I. INDIRECT COSTS (F&A)(SPECIFY RATE AND BASE)								
MTDC (Rate: 49.0000, Base: 1235590)								
TOTAL INDIRECT COSTS (F&A)						605,439		
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)						3,248,787		
K. RESIDUAL FUNDS						0		
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)						\$ 3,248,787		
M. COST SHARING - PROPOSED LEVEL \$ Not Shown				AGREED LEVEL IF DIFFERENT \$				
PI/PD NAME				FOR NSF USE ONLY				
[REDACTED]				INDIRECT COST RATE VERIFICATION				
ORG. REP. NAME*				Date Checked	Date Of Rate Sheet	Initials - ORG		
[REDACTED]								

Yellow Highlights: Numbers must be present on the budget in the Annual Report

BLUE HIGHLIGHTS:

Subawards: Must equal the cumulative amount of all subawards.

Green Highlights:

Total must be approved by PD.

Purple Highlights: Cost Sharing must be the cumulative amount of all years requested.

1 \*ELECTRONIC SIGNATURES REQUIRED FOR REVISED BUDGET

#### 4.9 Volume I Appendices

There are four required appendices in Volume I for FY 2013. The center may add additional appendices if it is necessary to better explain their operations and/or achievements. The

appendices should be tabbed in text for easy access by the reader. The required appendices and their descriptions are given next. The name of each appendix and the pages it covers should be provided in the table of contents. In addition, a list of all the appendices, and corresponding page numbers, should be provided at the beginning of the Appendix Section.

#### 4.9.1 Volume I, Appendix I – Glossary and Acronyms

Appendix I is the glossary of acronyms and special terms used in the Annual Report.

#### 4.9.2 Volume I, Appendix II – Agreements and Certifications

Appendix II is the Agreements and Certifications portion of the Annual Report and it contains the following documents. The certifications listed here (items 4,5,6,7) must be certified by an Authorized Organizational Representative (AOR) in the sponsored projects office of the lead institution. The lead institution is responsible for reporting and obtaining certifications for the entire center.

1. ERC's Current Center-wide Industrial/Practitioner Membership Agreement.
2. ERC's Center-wide Intellectual Property Agreement (if not part of the Generic Industrial/Practitioner Membership Agreement).
3. A copy of the Animal and/or Human Subjects approval from the relevant Institutional Review Boards (IRBs) from *each* institution where animal and/or human subjects are used. This must be obtained prior to the submission of the Annual Report/Renewal proposal. The appropriate box on the cover page of the report should be checked if there is a project(s) supported that involve animal or human subjects. If data are collected on the performance of ERC' students (REU or regular and the impact of pre-college programs on students) and these data are presented to the public through a publication or talk at a conference, an IRB Human Subjects approval is required.
4. Certification of the Industry/Practitioner Membership list that includes the total number of memberships paid since the last Annual Report, certified by an AOR. The private sector firms should be separated from the non-private sector organizations. Similar to ERCWeb Tables 4 and 5, firms or agencies that have not signed the membership agreement or have not paid their membership fee must not be included in the list, even if they have satisfied one but not all of the industrial/practitioner membership requirements. This certification list should be consistent with the members reported in Table 4.
5. Certification of Cumulative and Current Cost sharing (Table 9b), certified by an AOR. In addition to reporting the certification here, the AOR must submit the cost sharing certification via the standard Notifications/Requests portion of FastLane within 90 days of the end of the award year. If the submission of the certification is delayed, the processing of annual funding increments or renewal awards will also be delayed. If there is an error in a prior year cost-sharing amount, FastLane will not allow correction of the amount. Instead, the Center should adjust the current year amount so that the cumulative total cost sharing is accurate. The certification requirement does not apply to the Class of 2008 except for Iowa State University.
6. The ERC Lead Institution's Conflict-of-Interest Policy, certified by an AOR. The ERC should collect and maintain on file certified copies of COI policies from all of the partner institutions.
  - Specific COI policy information from the ERC lead institution regarding ERC faculty or student involvement in start-up firms or small businesses. In particular, the lead university's oversight policies with respect to COI for the following circumstances should be explained:

- Situations where ERC faculty or students spin-out start-up firms
  - Situations where it is necessary for the ERC to purchase products from a firm for which ERC faculty have fiduciary interests
7. Certification of Unexpended Residual Funds (Table 10a), certified by an AOR.

#### 4.9.3 Volume I, Appendix III – Table 7

Appendix III is the ERCWeb-produced **Table 7**, “ERC Personnel.” Table 7 lists personnel at both the center-wide summary level and the institutional levels. The table should be sized so that it can be easily read.

#### 4.9.4 Volume I, Appendix IV—Center Diversity Plan

The Center shall insert a copy of the center’s Diversity Plan as Appendix IV in the Annual Report.

## 5 VOLUME II REQUIREMENTS

Volume II contains supporting documents and must be a separate document from Volume I. It should include project descriptions, a bibliography of center publications, and faculty and leadership team biosketches (including Administrative/Managing Directors). Only renewal proposals require current and Pending Support documentation, NSF Form 1239, for the Director, Deputy Director and any Associate Directors, the Research Program Thrust Leaders, the Education Program Director, and for any faculty receiving \$80,000 or more from the ERC. Volume II should be assembled as follows. As with Volume I, the headings that follow should appear, in the order shown, in Volume II.

### 5.1 Table of Contents

The Table of Contents should include page numbers.

### 5.2 List of ERC Projects

The center will provide a list of all projects (research, education and outreach, and technology transfer, ERC innovation) in the center’s strategic plan that are funded by direct support from the center and all associated projects that are supported by indirect support. The center should provide on this list the names of the projects, the names and departmental/institutional affiliations of the faculty members, and the names of the sponsoring organization(s). The research projects should be listed by thrust, then by the education and outreach projects, and then by the technology transfer projects. This project list should cover all the research projects listed in the ERCWeb-produced Table 2 plus the education and outreach projects, translational research projects, and ERC Innovation and/or Translational Research projects regardless of the source of funds. Within each section, the projects should be grouped by the type of support—direct or indirect, and then grouped by content. If listing an associated project would compromise the sponsor’s interests, the project should be listed by title if possible with no mention of source of support.

### 5.3 Project Summaries

Three- to five-page project summaries for all projects with direct support, organized by Research Thrust and Education/Outreach Program should be provided. *Although potentially challenging, it*

*is expected that centers will adhere to the requested page limit for the project summaries; in fact, three page summaries (excluding references) are strongly encouraged!* Project summaries do not have to be included for proprietary projects where such a summary would compromise the sponsor's interests. A project summary should also be included for each ERC Program supplementary and special-purpose award such as ERC-SBIR Translational Research awards (e.g. SECO awards), ERC Innovation Awards, Graduate Research Supplements (GRS), etc. In general, project summaries do not have to be included for associated projects; rather an abstract of the project should be included as instructed in Section 5.4. However, although some Innovation Awards and ERC-SBIR and other NSF-funded Translational Research awards may be considered associated projects because the award was not made directly to the center or the center PI, full project summaries are required for these projects in Volume II. For Gen-3 ERCs, foreign partner associated projects may include a project summary rather than only an abstract if the project is of particular importance to the achieving the vision of the center.

Each project summary should include:

- Project title;
- Names of ERC team members involved with the project (project leader, other faculty and their departments, students from undergraduate through postdoctoral) and industrial participants;
- A statement of the project goals (what the work is intended to accomplish);
- The project's role in support of the strategic plan;
- A discussion of fundamental research, educational, or technology advancement barriers and the methodologies used to address them;
- **Any research aspect that involves foreign collaborations, especially indicating the length of time US faculty or students spent abroad conducting their work, and vice versa, and the value added of that work to the student's/faculty' work;**
- A short description of achievements in previous years with more detail on accomplishments in the past year;
- Summary of other relevant work being conducted within and outside of the ERC and how this project is different;
- Plans for the next year (for an Annual Report), or the next five years (for a renewal proposal);
- Expected milestones and deliverables for the project; and
- Member company benefits.
- If relevant, commercialization impacts or course implementation information

#### **5.4 Associated Project Abstracts**

Title, project leader, direct funding amount, source of funding, and project abstracts for all projects reported as “associated” should also be provided in the relevant thrust areas. If the project is confidential and the sponsor does not want an abstract included in the report, merely include the title, if that’s approved by the sponsor. If neither are approved, leave the project out.

#### **5.5 Data Management Plan**

The [NSF Proposal & Award Policies & Procedures Guide \(PAPPG\)](#) contains a clarification of NSF's long standing data policy. All NSF awardees must comply with NSF data sharing policy, see <http://www.nsf.gov/bfa/dias/policy/dmp.jsp> In addition, ENG grantees must follow the ENG Directorate specific data management guidelines available at [http://nsf.gov/eng/general/ENG\\_DMP\\_Policy.pdf](http://nsf.gov/eng/general/ENG_DMP_Policy.pdf) All renewal proposals must describe plans for

data management and sharing of the products of research, or assert the absence of the need for such plans. The Data Management Plan should be submitted as a portion of Volume II of the center's third or sixth year renewal proposal and is limited to two pages.

Specifically, the basic level of digital data to be archived and made available includes (1) the analyzed data and (2) the metadata that define how these data were generated. These are data that are or that should be published in theses, dissertations, refereed journal articles, supplemental data attachments for manuscripts, books and book chapters, and other print or electronic publication formats.

- Analyzed data are (but are not restricted to) digital information that would be published, including digital images, published tables, and tables of the numbers used for making published graphs.
- Necessary metadata are (but are not restricted to) descriptions or suitable citations of experiments, apparatuses, raw materials, computational codes, and computer-calculation input conditions.

## **5.6 Biographical Sketches**

Two-page Biographical Sketches of each member of the ERC's faculty and leadership team should be included per instructions specified in the [NSF Proposal and Award Policies and Procedures Guide, Part I: Proposal Preparation and Submission Guidelines](#)

## **5.7 Current and Pending Support (Only required for Renewal Proposals)**

The Current and Pending Support documentation, NSF Form 1239, for the Director, Deputy Director and any Associate Directors, the Research Program Thrust Leaders, the Education Program Director, and for any faculty receiving \$80,000 or more from the ERC should be included.

# **6 FORMATTING AND SUBMISSION REQUIREMENTS**

## **6.1 Formatting**

The center should comply with the following guidelines when preparing the Annual Report.

- Standard letter-sized paper with one-inch margins.
- Times New Roman font size 12, Arial font size 10, or equivalents:
  - Tables, the list of participants, the highlights of significant achievement and impact, references, biosketches, and non-narrative text may be provided one font size smaller but must be readable.
- Single-line spacing for the narrative.
- One-or two-column text.
- Insert tables, figures, photos and charts in appropriate places in the text, not at the end of a section or the end of the report.
- Tabs to mark the different sections of the report (including the subsections of the Infrastructure portion).
- Label the tabs with the names of the sections, not numbers.
- Use both sides of a page when producing copies.
  - If a color illustration bleeds through the page, a one-sided page may be used.

- Do not alter the numbering of the required data tables and make sure all required tables/charts are submitted:
  - For additional tables and charts, retain the numbers of the required tables and number the extra tables in a logical manner corresponding with the section number. Graphics, photographs, etc. may be numbered and labeled as the center wishes.
- For the Class of 2011 and earlier, submit the original copy as an unbound, one-sided copy, held together with a binder clip. The Class of 2012 and later no longer has a requirement to submit a paper copy because all records will be kept electronically.
- For the Class of 2011 and earlier, include the first page of NSF form 1207 in the printed copies of the report, but include the signature page only in the one unbound original. This requirement does not apply to the Class of 2012 and later.
- All additional copies should be spiral bound and double-sided in two separate volumes: Volume 1 and Volume 2. Do not bind both volumes together and do not submit the Annual Report or Renewal Proposal in a 3 ring binder.
- Keep the Information About the Principal Investigators/Project Directors (NSF Forms 1225, one for each Principal Investigator / Project Director) with the original, unbound copy and do not include it with the other copies.
- Make sure that all tables and charts are legible and size the ERCWeb-produced ones appropriately.
- Make sure all specified tables and charts are included in the report. Funding for the ERC will be withheld until all specified tables and charts are submitted.
- Do not alter the content of ERCWeb-produced tables; however, the font size can be increased so that the tables are readable.

## 6.2 Submission

The center should comply with the following guidelines when submitting the Annual Report or Renewal Proposal. It must arrive at NSF at least five weeks before a scheduled site visit. (In addition to the copies noted below, the centers will also send electronic or paper copies of the Annual Report to site visit team members directly. See the Site Visit Guidelines for more information.)

- Make 5 paper copies and 6 CD copies with PDF versions of the Annual Report, all Volumes;
- Place the name of the center and the calendar year of the annual report or renewal proposal on all CDs; and
- Mail 5 copies of the report, 5 of the CDs, and the original unbound signed copy of the report in a package to:

Mr. Marshall Horner, Program Assistant  
 Engineering Research Centers Program  
 Division of Engineering Education and Centers, Suite 585  
 National Science Foundation  
 4201 Wilson Boulevard  
 Arlington, VA 22230  
 Phone: (703) 292-2308  
 Facsimile: (703) 292-9051  
 Email: [mhorner@nsf.gov](mailto:mhorner@nsf.gov)

- Mail the remaining CD to Mr. Courtland Lewis, the ERC Program’s Communications Consultant, at the following address. Court uses it to prepare reports and documents for the ERC Program on outcomes and impacts.

Mr. Courtland S. Lewis  
 310 Meadowview Lane  
 Unicoi, TN 37692

- In addition, the each center should upload a copy of the entire Annual Report (Volume 1 and Volume 2) to the ERCWeb Database system using the link provided by the ERCWeb contractor.

For ERCs that cost share, the lead institution’s AOR must submit the cost sharing certification via the Notifications/Requests portion of FastLane within 90 days of the end of the award year. Delaying submission of the certification holds up the processing of annual funding increments or renewal awards.

In accordance with the instructions provided in this document, the ERC Annual Project Report must be submitted directly to the ERC Program Office and include the contents as specified in this document. The submitted report is then uploaded into the NSF eJacket system by the NSF ERC Program staff. The Annual Report will be reviewed and approved by the cognizant NSF ERC Program Director within eJacket, as was done when the reports were submitted via FastLane. The center does not use [Research.gov](http://Research.gov) to submit the contents of its Annual Report, but it does use [Research.gov](http://Research.gov) to indicate that the Report has been submitted, as described below.

Submit notification to [Research.gov](http://Research.gov) as follows:

- **Cover Tab:** Review all the information displayed in the Cover tab within the Annual Project Report section of [Research.gov](http://Research.gov). Please verify the information in the Cover Tab within the Annual Project Report section of [Research.gov](http://Research.gov). If any corrections are required, contact the [Research.gov](http://Research.gov) Help Desk 7 AM - 9 PM Eastern Time, Monday through Friday (except federal holidays) at [rgov@nsf.gov](mailto:rgov@nsf.gov) or 1-800-381-1532.
- **Accomplishments Tab:** Under the Accomplishments tab, insert the following statement into the first box that asks “What are the major goals of the project?”
  - o “In accordance with the instructions provided to the Engineering Research Centers (ERC) in the ERC Annual Reporting Guidelines document, the Annual Project Report has been submitted separately directly to the ERC Program Office and includes the content specified in the Guidelines. The report is uploaded into the NSF eJacket system by the ERC Program Staff. The cognizant ERC Program Director will approve the report within the NSF eJacket system.”
  - o Next, there are four boxes under the question, “What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?” In the first box, Major Activities, insert the same statement identified above: “In accordance with the instructions provided to the Engineering Research Centers (ERC) in the ERC Annual Reporting Guidelines document, the Annual Project Report has been submitted separately directly to the ERC Program Office and includes the content specified in the Guidelines. The report is uploaded into the NSF eJacket



system by the ERC Program Staff. The cognizant ERC Program Director will approve the report within the NSF eJacket system.”

- o Leave the next three boxes blank.
- o The last three boxes have a “nothing to report” or “no change” checkbox. Do not enter any text, just mark the “nothing to report” or “no change” checkbox for each question.
- **Products tab:** Under the products tab, do not enter any information. Mark the “nothing to report” checkbox for each question.
- **Participants tab:** The section “What individuals have worked on the project?” will be pre-populated with the names of the PIs for the ERC. Review and edit as appropriate. Note: The Center may have to enter the names of some of the leadership team. There should be information on the Center Director, Deputy Director, Thrust Leader(s), Campus Leader(s), Industrial Liaison Officer, Administrative Director, and Executive Director or other center leadership position. The title (e.g. Center Director, ILO, etc.) should be entered in the “contribution to the Project” box.
  - o For the “What other organizations have been involved as partners?” question, mark the “nothing to report” checkbox.
  - o For the “Have other collaborators or contacts been involved?” mark No.
  - o For the REU required field, check “nothing to report” and type “N/A” in the comments field.
- **Impact tab:** Mark the “nothing to report” checkbox for all of the questions.
- **Changes/Problems tab:** Mark the “nothing to report” checkbox for all of the questions.
- **Special Requirements:** Mark the “nothing to report” checkbox.
- **Certify and submit.** Check the Certification checkbox and click on the Submit Report Button.

Note: All of the information regarding the center’s accomplishments, contributions, publications, products, etc. must be contained within the Annual Report that is submitted directly to the ERC program office. Entering “nothing to report” in the Annual Report submission in [Research.gov](http://Research.gov) does not imply that the center did not make progress or contributions during the reporting period. It is a means of allowing the ERCs to continue to report under the Annual Reporting guidelines and submitting an integrated set of documents useful to the site visit team and to NSF program officers.

Table 6.2.1 summarizes the renewal and increment submission protocol.

End of Award Year	Center submits notice to Research.gov under original Award Number that Annual Report has been submitted to NSF under guidance in ERC Annual Reporting Guidelines	Renewal / Increment Due	Submit Cover Sheet & Budget in FastLane *	Action to submit in FastLane	Wording for "Project Summary" field within FastLane	Wording for "Justification for Supplement" field within FastLane	Wording for "Biographical Sketch" field within FastLane	Cost Sharing Certification under notifications and requests in FastLane under original Award Number	Updated IRB approvals for Human subjects or Vertebrate Animals submitted in supplementary documents section of Supplement or Renewal Request, as applicable
1	Annual Report due 5 weeks before site visit to ERC program staff for manual upload into eJacket	CAGR Increment	Yes; yr 2 budget and all subaward budgets	supplement	"This action is to request the 2nd yr increment"	"This action is to request the 2nd yr increment"	"No Bio Data Provided"	Yes	if applicable
2	Annual Report due 5 weeks before site visit to ERC program staff for manual upload into eJacket	CAGR Increment	Yes; yr 3 budget and all subaward budgets	supplement	"This action is to request the 3rd yr increment"	"This action is to request the 3rd yr increment"	"No Bio Data Provided"	Yes	if applicable
3	Renewal Proposal due 5 weeks before site visit to ERC program staff for manual upload into eJacket	<b>RENEWAL (yrs.4-8)</b>	Yes; yrs 4-8 budget and all subaward budgets	Renewal	"This action is to request 3 <sup>rd</sup> year renewal and 4 <sup>th</sup> year increment. See annual report for annual report and renewal documents"	n/a	"No Bio Data Provided"	Yes	if applicable
4	Annual Report due 5 weeks before site visit to ERC program staff for manual upload into eJacket	CAGR Increment	Yes; yr 5 budget and all subaward budgets	supplement	"This action is to request the 5th year increment"	"This action is to request the 5th year increment"	"No Bio Data Provided"	Yes	if applicable
5	Annual Report due 5 weeks before site visit to ERC program staff for manual upload into eJacket	CAGR Increment	Yes; yr 6 budget and all subaward budgets	supplement	"This action is to request the 6th year increment"	"This action is to request the 6th year increment"	"No Bio Data Provided"	Yes	if applicable
6	Renewal Proposal due 5 weeks before site visit to ERC program staff for manual upload into eJacket	<b>RENEWAL (yrs. 6-10)</b>	Yes; yrs 7-10 budget and all subaward budgets	supplement	"This action is to request the 6th year renewal and year 7 increment"	"This action is to request the 6th year renewal and year 7 increment"	"No Bio Data Provided"	Yes	if applicable
7	Annual Report due 5 weeks before site visit to ERC program staff for manual upload into eJacket	CAGR Increment	Yes; yr 8 budget and all subaward budgets	supplement	"This action is to request the 8th year increment."	"This action is to request the 8th year increment."	"No Bio Data Provided"	Yes	if applicable
8	Annual Report due 5	CAGR	Yes; yr 9	supplement	"This action is to request	"This action is to	"No Bio Data	Yes	if applicable

	weeks before site visit to ERC program staff for manual upload into eJacket	Increment	budget and all subaward budgets		the 9th year increment."	request the 9th year increment."	Provided"		
9	Annual Report due 5 weeks before site visit to ERC program staff for manual upload into eJacket	CAGR Increment	Yes; yr 10 budget and all subaward budgets	supplement	"This action is to request the 10th year increment."	"This action is to request the 10th year increment."	"No Bio Data Provided"	Yes	if applicable
10	Final report due 90 days after expiration date (or center must request a no-cost extension, see Final Reporting Guidelines)	end of award	n/a	n/a	n/a	n/a	n/a	n/a	n/a

***Table 6.2.1 ERC Renewal and Increment Submission Protocol***

\*Budget should include budget justification and explanation for any dollars placed in budget line item G6; also subcontract budgets if dollars entered on line G5

## 7 GLOSSARY

The complete glossary of ERC terms can be found in the *Guidelines for ERCWeb Data Entry*, available at the ERC Library site <https://www.erc-reports.org/public/library>

## 8 RESOURCES

### 8.1 NSF Documents

1. The [NSF Proposal and Award Policies and Procedures Guide](http://www.nsf.gov/pubs/policydocs/pappguide/nsf15001/index.jsp)  
<http://www.nsf.gov/pubs/policydocs/pappguide/nsf15001/index.jsp>
2. The [Guide to Programs](http://www.nsf.gov/funding/browse_all_funding.jsp), which lists and describes all of NSF's programs:  
([http://www.nsf.gov/funding/browse\\_all\\_funding.jsp](http://www.nsf.gov/funding/browse_all_funding.jsp))
3. NSF-wide [REU Program Announcement](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5517&org=NSF) can be found at:  
[http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5517&org=NSF](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5517&org=NSF)
4. RET program information:  
[http://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=5736&org=EEC&from=home](http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5736&org=EEC&from=home)

### 8.2 ERCWeb

#### 8.2.1 [ERCWeb Technical Assistance](#)

*Toll-free phone [\(800\) 981-2852](tel:8009812852) (9am-5pm M-F EDT);*

*e-mail: [support@erc-reports.org](mailto:support@erc-reports.org)*

8.2.2 [Documents regarding ERC planning information, reports, and site visits can be found at the ERCWeb Library site: <https://www.erc-reports.org/public/library>](#)

### 8.3 Center Documents

#### 8.3.1 [Cooperative Agreement –Fastlane <https://www.fastlane.nsf.gov/>](https://www.fastlane.nsf.gov/)

Proposals,Awards and Status – login - Award and Reporting Functions\View/Print Award Documents\Active Awards

#### 8.3.2 [History of Funding - Fastlane <https://www.fastlane.nsf.gov/>](https://www.fastlane.nsf.gov/)

Proposals, Awards and Status – login - Award and Reporting Functions\View/Print Award Documents\Active Awards or Expired Awards

