



Propulsion Research Center
University of Alabama in Huntsville

Strategic Plan

2011 – 2015

Adopted: November 2010

Propulsion Research Center
University of Alabama in Huntsville
Strategic Plan 2015

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Propulsion Research Center
University of Alabama in Huntsville
Strategic Plan 2015
Executive Summary

PRC Strategic Vision 2015

The PRC will be a major generator of talent and innovative solutions in propulsion and energy related technologies.

The PRC Mission

PRC connects the Academic Research community with Industry & Government to advance basic science and technology development related to propulsion and energy.

STRATEGIC ISSUES

w/ Immediate Impact

- NASA future direction/role(s)
- ? Private company role(s) in space
- State funding for Education
- + “Green” energy movement
- Faculty shortage
- Loss of faculty - retirements
- + Positive for PRC, - Negative for PRC,

w/ Long-term Implications

- + Military roles in space
- ? R&D investment/spending in U.S.
- Globalization vs. ITAR
- ? U.S. Energy Policy or lack thereof
- + Demand for aerospace engineers
- ? Foreign space programs
- ? Unknown Probable Effect

STRATEGIC GOALS 2011-2015

- Goal 1. Expand Partnerships - Strengthen relationships with key organizations and individuals with which PRC can collaborate and conduct research
- Goal 2. Focus Research Opportunities – Select a few broad areas of research on which PRC can concentrate its resources of time and money
- Goal 3. Promote the PRC – Increase awareness of the PRC’s successes and capabilities with key audiences
- Goal 4. Develop People - Keep the educational responsibility of a university in mind by investing to increase the knowledge and skills of faculty and students associated with the PRC
- Goal 5. Enhance the Facility – Maximize the utilization of the real assets to aid in the communication of the world-class research being conducted

STRATEGIC INITIATIVES

- Target Research Sponsors & Partners
- Engage Local Industry in the PRC
- Select Target Areas for Research
- Promote the Talent & Capabilities of the PRC
- Enhance Awareness of the PRC among Key Propulsions & Energy Sectors
- Attract new Faculty to Work in the PRC
- Support Student Achievement through the PRC
- Create a Research Lab that Reflects World-class Research Capabilities
- Engage and Inform State & National Leaders in the Success of the PRC

KEY RELATIONSHIPS

- NASA – MSFC, JPL
- DOD – Army, MDA, Air Force, Navy, Marines, Coast Guard
- PRC Advisors
- PrattWhitney Rocketdyne
- Congressional Leaders & Staff
- Senators & Staff
- UA Systems Trustees
- Foreign Space Agencies??
- Auburn University
- Purdue University
- Penn State University

FINANCIAL RESOURCES & TARGETS

| | <u>2010</u> | <u>2011</u> | <u>2013</u> | <u>2015</u> |
|---------------------------|--------------------|--------------------|--------------------|--------------------|
| Announced Research Awards | <u>\$1,684,420</u> | <u>\$1,500,000</u> | <u>\$2,500,000</u> | <u>\$3,000,000</u> |
| Research Conducted | \$1,231,322 | \$1,500,000 | \$2,500,000 | \$3,000,000 |
| State Funding | \$199,034 | \$190,000 | \$190,000 | \$190,000 |
| Other Funding | <u>\$120,000</u> | <u>\$25,000</u> | <u>\$31,000</u> | <u>\$39,000</u> |
| Total | <u>\$1,550,356</u> | <u>\$1,715,000</u> | <u>\$2,721,000</u> | <u>\$3,229,000</u> |

Propulsion Research Center University of Alabama in Huntsville Strategic Plan 2015

Mission

PRC connects the Academic Research community with Industry & Government to advance basic science and technology development related to propulsion and energy.

Strategic Vision

The PRC will be a major generator of talent and innovative solutions in propulsion and energy related technologies.

PRC Background

- Eighteen years experience in propulsion and related technologies
- Over \$18M of fundamental and applied research
- Over 120 U.S. graduates working in aerospace
- Numerous awards from AIAA, NASA, DOD, Academia:
- AFRL, NASA, DOD, DOE, DARPA, JAXA, SMDC, Allied Aerospace, Aerojet, ASI, Barber Nichols, Boeing, CFDRC, ERC, Hyper V, Jacobs, Luna Technologies, Lockheed Martin, Metacomp, Optechnology, Orbitec, Orion, Perkins Technical Services, Streamline Automation, Pratt & Whitney Rocketdyne, Qualis, Streamline Automation, 3-D Technologies, University of Maryland, and others

PRC Leadership

Director Robert Frederick, Ph.D., Interim Director

Professor, Mechanical & Aerospace Engineering

B.S. (Mechanical Engineering), Purdue University, 1980

M.S. (Engineering), Purdue University, 1982

Ph.D. (Aerospace Engineering), Purdue University, 1988

Research Interests:

Solid and hybrid propulsion, combustion diagnostics, real-time radiography, image processing, rocket plume diagnostics, data acquisition, gelled propellants, combustion instability.

Vitae:

Dr. Frederick is currently a Professor of Mechanical and Aerospace Engineering and the Director of the UAHuntsville Propulsion Research Center. He has overseen over 5.4

million dollars externally funded research in solid propellant combustion, combustion stability of liquid injectors, hybrid fuel combustion, thermal stability of hydrocarbon fuels, and characterization of rocket plume emissions. His research has experimentally revealed important combustion phenomena in the area of solid, liquid, and hybrid propellants. He pioneered an international, team-based design laboratory that integrates students and industry mentors from engineering, liberal arts, and business disciplines. Dr. Frederick is an Associate Fellow of the AIAA and member of the American Society of Engineering Educators. He has served as the national chair of the AIAA Hybrid Rocket Technical Committee and the U.S. Representative for the Air Force and Navy to a NATO Advisory Group on solid propellant burning rate measurements. Dr. Frederick received his Ph.D. in Aeronautics and Astronautics from Purdue University in 1988. His professional experience includes positions at Allison Turbine Engines, the Air Force Rocket Propulsion Laboratory, and Sverdrup Technology, AEDC Group. In 1991, he joined the UAH Department of Mechanical and Aerospace Engineering.

Strategic Goals for 2011-2015

- Goal 1. Expand Partnerships – Strengthen relationships with key organizations and individuals with which PRC can collaborate and conduct research
- Goal 2. Focus Research Opportunities – Select a few broad areas of research on which PRC can concentrate its resources of time and money
- Goal 3. Promote the PRC – Increase awareness of the PRC’s successes and capabilities with key audiences
- Goal 4. Develop People - Keep the educational responsibility of a university in mind by investing to increase the knowledge and skills of faculty and students associated with the PRC
- Goal 5. Enhance the Facility – Maximize the utilization of the real assets to aid in the communication of the world-class research being conducted

| UAHuntsville Powers of 10 Impacts | <u>Actual 2010</u> | <u>Annually by Year 5</u> | <u>Five Year Total</u> |
|-----------------------------------|--------------------|-------------------------------|------------------------|
| Research Expenditures | \$1,231,000 | \$3,000,000 | \$11,250,000 |
| Students Engaged with the PRC | 10 | 20 | 64 |
| Academics – PhD’s Granted | 1 | 3 | 10 |
| Academics – Masters Degrees | 12 | 20 | 60 |

Propulsion Research Center

MAJOR INITIATIVES 2011-15

Goal 1. Expand Partnerships

First Initiative: Target Research Sponsors & Partners

Action Items

1. Create a set of criteria to use to search for, screen, and select research projects
2. Create a partner recruitment package that describes how to be a members of the PRC Team and how the PRC Team can benefit other teams
3. Prepare a competitor analysis - summary of significant competitors and their strengths and weaknesses

Initiative Team:

Leader: Principal Investigator and/or Student

Members: PRC Advisors

Relationships to Leverage:

COE Dean

UAH VP of Research

Timing:

G1.1.1 Quarter 1

G1.1.2 Quarter 2 – Quarter 3, Q 9, Q13, Q17

G1.1.3 Quarter 3 – Quarter 4

Milestones:

G1.1.1 Completion and use of criteria for considering opportunities – Due Q1

G1.1.2 Completion of partner recruitment & promotion package for teaming – Due Q3

G1.1.3 Completion of a competitor analysis – Due Q4

Resource Requirements

Total Investment over 5 Years: \$0

Total Time: 12 Months

G1.1.1 Time only for developing the criteria

G1.1.2 Time for staff to collect information. Funding to hire publications assistance

G1.1.3 Time to place, communicate, and support a student team in the College of Business Administration

Metrics:

Number of opportunities identified, screened, and pursued

Number of partners on PRC team

Number of teams on which PRC is a partner

List of key competitors for propulsion and energy related research

Goal 1. Expand Partnerships

Second Initiative: Engage local industry and university students in the PRC

Action Items

1. Establish a regular (semester) event for [propulsion] industry leaders to make presentations on their companies research work to faculty, students, and other propulsion related industry
2. Recruit industry “sponsors” of propulsion and energy student projects

Initiative Team:

Leader: Principal Investigator and/or Student

Members: PRC Advisors

Relationships to Leverage:

Huntsville Chamber of Commerce

American Institute of Aeronautics & Astronautics (AIAA)

Timing:

G1.2.1 Quarter 5 – Quarter 10

G1.2.2 Quarter 11 – Quarter 20

Milestones:

G1.2.1 Draft of an event, recruitment of sponsors, hosting the first event – Due Q6

G1.2.2 List of industries to target, confirmation of first sponsor, placement of first student project – Due Q12

Resource Requirements

Total Investment over 5 Years: \$9,000

Total Time: 18 Months

G1.2.1 Time for event concept development, planning, and hosting event

Dollars for marketing and hosting event. Sponsor funding required.

G1.2.2 Time for assembly of recruitment materials

Dollars for preparation of recruitment materials

Metrics:

Number of industries recruited to make presentations

Number and/or level of sponsors recruited

Number of key stakeholder names on invitation list

Number of attendees – faculty, students, industry leaders

Goal 1. Expand Partnerships

Third Initiative: Select target areas for propulsion and energy research

Action Items

1. Research the NASA probable future direction and engage MSFC (and other NASA Centers) leaders in propulsion and energy visioning
2. Research, contact, and visit with commercial space company leaders in propulsion and energy to discuss grand challenges
3. Identify, contact, and visit with leaders of the Air Force, Army, Navy, Marines propulsion and energy related development (R&D, Integration) to discuss grand challenges

Initiative Team:

Leader: Principal Investigator and/or Student

Members: PRC Advisors

Relationships to Leverage:

Dave Christensen

VP of Research

UAH President

Congressional Representative 5th District, Mo Brooks

Senators Shelby & Sessions

Timing:

G1.3.1 Quarter 5 – Quarter 7

G1.3.2 Quarter 5 – Quarter 7

G1.3.3 Quarter 5 – Quarter 12

Milestones:

G1.3.1 Meeting with NASA-MSFC Leader(s) – Due Q5

G1.3.2 Meeting with Commercial Space company leaders – Due Q6

G1.3.3 Meetings with leaders in each branch of military - Due Q8

Resource Requirements

Total Investment over 5 Years: \$34,100

Total Time: 24 Months

G1.3.1 Time for setting meetings, preparing for, and conducting the meetings

Dollars for travel for meetings

G1.3.2 Time for setting meetings, preparing for, and conducting the meetings

Dollars for travel for meetings

G1.3.3 Time for setting meetings, preparing for, and conducting the meetings

Dollars for travel for meetings

Metrics:

Number of appointments with key stakeholders

Quality of insight gained through meetings

Goal 2. Focus Research Opportunities

First Initiative: Establish an opportunity discovery process for the PRC

Action Items

1. Encourage faculty, students, researchers, and administrative staff to identify opportunities and present to a PRC Opportunity Review Team
2. Create a PRC Opportunity Review Team to consider, select, and support the pursuit of research opportunities in the research focus area of the PRC

Initiative Team:

Leader: Director PRC

Members: Faculty

Students

Researchers

Administrative staff

Relationships to Leverage: N/A

Timing:

G2.1.1 Quarter 5 – Quarter 6, Q11, Q12

G2.1.2 Quarter 6

Milestones:

G2.1.1 Established incentive plan for encouraging opportunities identification – Due Q4

G2.1.2 Recruitment of Opportunity Review Team, First meeting of Team – Due Q5

Commitment of resources to opportunity selected – Due Q6

Resource Requirements

Total Investment over 5 Years: \$14,000

Total Time: 12 Months

G2.3.1 Dollars for potential incentives

G2.3.2 Time for preparing for, and conducting the meetings

Metrics:

Number of opportunities identified

Number of opportunities chosen to support

Number/amount of successful wins from chosen opportunities

Goal 3. Promote the PRC

First Initiative: Continually and consistently promote the PRC talent and capabilities

Action Items

1. Implement a communication plan to inform key audiences regularly of PRC achievements and capabilities, and track results
2. Create communication materials about the PRC successes and capabilities

Initiative Team:

Leader: PRC Director
Members: Consultant(s)
PRC Staff
Students

Relationships to Leverage:

Karen Yarbrough
Amy Turner
Crystal Morgan

Timing:

G3.1.1 Quarter 2 – Quarter 20
G3.1.2 Quarter 2 – Quarter 3

Milestones:

G3.1.1 Hiring communications expertise to implement the plan – Due Q1
G3.1.2 Hiring communications expertise to develop communication materials – Due Q1

Resource Requirements

Total Investment over 5 Years: \$65,900
Total Time: 57 Months
G3.1.1 Dollars for expertise, promotion, measurement
G3.1.2 Dollars for creation of materials

Metrics:

Selection and hiring of expertise
Adoption of a communications plan for PRC
Reach success metrics including response rates

Goal 3. Promote the PRC

Second Initiative: Maintain and enhance awareness of the PRC in key propulsion and energy related sectors. Improve visibility of the PRC Research Facility

Action Items

1. Develop at least one annual on-campus event to attract target industry leaders
2. Develop/Identify one annual off-campus event to host or co-host (local or out of area)

Initiative Team:

Leader: PRC Director

Members: PRC Staff

Event planner

Relationships to Leverage: USSRC, NASA MSFC,

Timing:

G3.2.1 Quarter 5 – Quarter 8

G3.2.2 Quarter 17 – Quarter 20

Milestones:

G3.2.1 Draft Agenda for an on-campus event – Due Q5

Recruitment of sponsors for event – Due Q6

G3.2.2 Collaboration agreement executed with other organization(s) – Due Q18

Resource Requirements

Total Investment over 5 Years: \$24,000

Total Time: 24 Months

G3.2.1 Dollars for marketing and hosting meeting

Time to develop event and follow-up with attendees

G3.2.2 Dollars to market and co-host event

Time for developing an event, co-host, follow-up with attendees

Metrics:

Draft of events, name, place, invitation list, etc

Response rate to invitations

Attendance level for events

Follow-up to evaluate success

Goal 4. Develop People

First Initiative: Attract New Faculty to work in the PRC areas of focus

Action Items

1. Contribute materials to be used in the recruitment and selection of Mechanical & Aerospace Engineering faculty
2. Prepare a briefing for candidates and an orientation plan for the new faculty

Initiative Team:

Leader: PRC Director

Members: Faculty

Relationships to Leverage: MAE Faculty, Purdue, Penn State

Timing:

G4.1.1 Quarter 1, Q7, Q15

G4.1.2 Quarter 1 – Quarter 2, Q8, Q16

Milestones:

G4.1.1 Recruiting materials creation and submission – Due Q1

G4.1.2 Creation of briefing for candidates – Due Q1

G4.1.3 Creation of orientation for new professor – Due Q2

Resource Requirements

Total Investment over 5 Years: \$5,000

Total Time: 3 Months

Metrics:

Opening of position(s)

Interviews of candidates

Selection of candidate(s)

Arrival of new professor(s)

Goal 4. Develop People

Second Initiative: Support student achievement through the PRC

Action Items

1. Establish a budget allocation of resources to support student researchers for supplies, research, travel, etc
2. Promote research opportunities to undergraduate and graduate students at UAHuntsville and other targeted universities

Initiative Team:

Leader: PRC Director

Members: Faculty Members, Research Staff, Student Researchers

Relationships to Leverage:

Faculty

Graduate Recruiting Office

PRC Alumni

Timing:

G4.2.1 Quarter 1 – Quarter 2

G4.2.2 Quarter 3 – Quarter 20

Milestones:

G4,2.1 Establishment of a budget account – Due Q1

G4.2.2 Recruitment of students – Due Q4

Graduation of students – Due Q16

Resource Requirements

Total Investment over 5 Years: \$37,000

Total Time: 60 Months

G4.2.1 Dollars to establish budget

G4.2.2 Time and possible dollars to promote PRC opportunities to students

Metrics:

Dollars allocated

Undergraduate, Graduate, Ph.D. Students recruited

Undergraduate, Graduate, Ph.D. Students graduated

Goal 5. Enhance the PRC Research Facility

First Initiative: Create a propulsion and energy research lab that represents the world-class research conducted here

Action Items

1. Complete the 5-S process on the PRC Facility. (Sorting, Straightening, Sweeping, Standardizing, Sustaining, and Safety)
2. Develop and make accessible to all PRC researchers documentation on all of the systems of the facility
3. Renovate the facility to accommodate visitors and observers in a safe and impressive way

Initiative Team:

Leader: Dr. Jason Cassibry

Members: Tony Hall

Relationships to Leverage:

COE Dean Mahalingam

Tom Koshut

Timing:

G5.1.1 Quarter 1

G5.1.2 Quarter 2 – Quarter 4

G5.1.3 Quarter 13 – Quarter 20

Milestones:

G5.1.1 Completion of 5-S effort – Due Q1

G5.1.2 Documentation of standard processes & safety information on systems – Due Q4

G5.1.3 Securing funding for renovation – Due Q12

Design of renovated facility – Due Q15

Start of renovation – Due Q16

Completion of renovation – Due Q20

Resource Requirements

Total Investment over 5 Years: \$31,000

Total Time: 36 Months

G5.1.1 Time to complete 5-S

G5.1.2 Time to assemble documentation

Potential dollars for consultant

G5.1.3 Funding to Renovate/Upgrade/Expand

Metrics:

Number of visitors to facility

Safety goals at the facility continue to be upheld

Survey & receive positive feedback from PRC researchers on access & quality of systems documentation within the research facility

Goal 5. Enhance the PRC Research Facility

Second Initiative: Inform congressional and legislative officials and staff about the PRC

Action Items

1. Develop a standard tour for government visitors
2. Create a schedule to invite elected leaders and staff to visit
3. Implement the invitation plan

Initiative Team:

Leader: Dr. Jason Cassibry

Members: Anthony Edmundson, Student Researcher

Relationships to Leverage:

UAH President

VP Research

Congressional Representative 5th District, Mo Brooks

Senators Shelby and Sessions

UA Board of Trustees from local area – Joe Ritch and Ron Gray

Timing:

G5.2.1 Quarter 4

G5.2.2 Quarter 5

G5.2.3 Quarter 6 – Quarter 20

Milestones:

G5.2.1 Draft of PRC tour itinerary – Due Q4

G5.2.2 Preparation of an invitation list – Due Q5

G5.2.3 Kickoff of invitations - Due Q6

Resource Requirements

Total Investment over 5 Years: \$5,000

Total Time: 51 Months

G5.2.1 Time to formalize an itinerary

G5.2.2 Time to collect names of persons & positions to be invited

G5.2.3 Dollars to create/buy visitor packages, supplies, mementos

Metrics:

Number of persons on invitation list

Number of visits per time period

Number of follow-up communications with visiting leaders

Number of leads generated by visitors to PRC

Propulsion Research Center
Financial Resources & Targets

| Propulsion Research Center Strategic Plan 2011-2015 ProForma Financial Statement | | | | | | | Notes |
|--|----------------|----------------|----------------|----------------|----------------|----------------|--|
| | Actual 2010 | Year 1 2011 | Year 2 2012 | Year 3 2013 | Year 4 2014 | Year 5 2015 | Total 5 years |
| Research Awards | \$1,684,420 | \$1,500,000 | \$1,500,000 | \$2,500,000 | \$2,750,000 | \$3,000,000 | \$11,250,000 |
| Research Expenditures | 1,231,322 | 1,500,000 | 1,500,000 | 2,500,000 | 2,750,000 | 3,000,000 | 11,250,000 A |
| State Funding | 199,034 | 190,000 | 190,000 | 190,000 | 190,000 | 190,000 | 950,000 B |
| University Investment | 120,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 125,000 C |
| Income from Programs | - | 6,000 | 6,000 | 6,000 | 6,000 | 14,000 | 32,000 D |
| Total Funding | 1,550,356 | 1,715,000 | 1,721,000 | 2,721,000 | 2,971,000 | 3,229,000 | 12,357,000 |
| Research Expenses less F&A | 840,492 | 1,018,330 | 1,018,330 | 1,697,217 | 1,866,938 | 2,036,660 | 7,637,475 E |
| Operating Expenses - State Funding | 212,667 | 190,000 | 190,000 | 190,000 | 190,000 | 190,000 | 950,000 F |
| Operating Expenses - F&A Returned | - | 12,407 | 3,407 | 11,012 | 13,213 | 9,514 | 49,553 G |
| Expenses from Programs | - | 6,000 | 6,000 | 6,000 | 6,000 | 14,000 | 32,000 H |
| Initiative Expenses w/o Programs | - | 24,200 | 33,200 | 50,000 | 53,900 | 63,700 | 225,000 I |
| F&A Overhead | | | | | | | J |
| To University | 315,790 | 389,189 | 389,189 | 648,649 | 713,514 | 778,379 | 2,918,921 |
| To COE | 29,703 | 36,607 | 36,607 | 61,012 | 67,113 | 73,214 | 274,552 |
| To PIs | 15,633 | 19,267 | 19,267 | 32,111 | 35,322 | 38,534 | 144,501 |
| Directed Projects - Univ. Investment | 120,000 | 25,000 | 25,000 | 25,000 | 25,000 | 25,000 | 125,000 C |
| Total Expenses | 1,534,286 | 1,715,000 | 1,721,000 | 2,721,000 | 2,971,000 | 3,229,000 | 12,357,001 |
| Expenses under/(over) Revenue | \$16,070 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Notes & Key Assumptions | | | | | | | |
| A Revenue at 2010 level through 2012 | | | | | | | E Expenditures equal to ratable awards received each year |
| Increases as marketing produces results in 2014 | | | | | | | F Travel, supplies, maintenance, etc. for PRC paid from State funds |
| B No increase in state funding from 2010 level | | | | | | | G Expenses above strategic initiatives funded by F&A returns to center |
| C University Special Funding only for directed projects | | | | | | | H Expenses for events are fully funded by sponsors |
| D Recruit sponsors for industry sessions of 1 per semester @ \$1,000 each | | | | | | | I Budget for strategic initiatives |
| + PRC Signature event sponsor(s) of \$4,000 starting 2012 | | | | | | | J F&A rate of 47.3% - distributed to university, COE/MAE, PIs |
| + Major off-campus co-host event at \$8,000 in 2015 | | | | | | | |

| PRC Strategic Plan 2011-2015 | | | | | | | |
|-------------------------------------|-------------------------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Budget by Goal Initiative | | | | | | | |
| | <u>Goal & Initiatives</u> | 2011 | 2012 | 2013 | 2014 | 2015 | Total |
| G.1.1 | Target Criteria | - | - | - | - | - | - |
| G.1.2 | Partner Recruiting Mat'ls | 1,000 | 2,000 | 2,000 | 2,000 | 2,000 | 9,000 |
| G.1.3 | Competitor Analysis | 2,000 | 6,000 | 7,200 | 8,700 | 10,200 | 34,100 |
| | G.1 Total | 3,000 | 8,000 | 9,200 | 10,700 | 12,200 | 43,100 |
| | | | | | | | |
| G.2.1 | Incentives for Opportunities | - | 2,000 | 3,000 | 4,000 | 5,000 | 14,000 |
| | | | | | | | |
| G.3.1 | Communication Consultant | 12,000 | 12,000 | 13,600 | 14,000 | 14,300 | 65,900 |
| G.3.2 | PRC Events on/off-campus | 2,000 | 4,000 | 4,000 | 4,000 | 10,000 | 24,000 |
| | G.3 Total | 14,000 | 16,000 | 17,600 | 18,000 | 24,300 | 89,900 |
| | | | | | | | |
| G.4.1 | Faculty & Staff Recruiting | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 5,000 |
| G.4.2 | Student Research Support | 5,000 | 5,000 | 8,000 | 9,000 | 10,000 | 37,000 |
| | G.4 Total | 6,000 | 6,000 | 9,000 | 10,000 | 11,000 | 42,000 |
| | | | | | | | |
| G.5.1 | Lab Docs & Renovation | 200 | 200 | 10,200 | 10,200 | 10,200 | 31,000 |
| G.5.2 | Leader tours - photos | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 5,000 |
| | G.5 Total | 1,200 | 1,200 | 11,200 | 11,200 | 11,200 | 36,000 |
| | | | | | | | |
| | Grand Total | 24,200 | 33,200 | 50,000 | 53,900 | 63,700 | 225,000 |

PRC Strategic Implementation Timeline

| | Year 1 | | Year 2 | | Year 3 | | Year 4 | | Year 5 | | | | | | | | | | | | |
|--|--------|----|--------|----|--------|----|--------|----|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 | Q19 | Q20 | |
| G1 Enhance & Expand Partners | | | | | | | | | | | | | | | | | | | | | |
| 1 Target Sponsors & Partners | | | | | | | | | | | | | | | | | | | | | |
| 1 Target Criteria | | | | | | | | | | | | | | | | | | | | | |
| 2 Partner Recruitment Mat'ls | | | | | | | | | | | | | | | | | | | | | |
| 3 Competitor Analysis | | | | | | | | | | | | | | | | | | | | | |
| 2 Engage Industry & Students | | | | | | | | | | | | | | | | | | | | | |
| 1 Create Event for Industry Leader Engagement | | | | | | | | | | | | | | | | | | | | | |
| 2 Recruit Industry Sponsors for Student Projects | | | | | | | | | | | | | | | | | | | | | |
| 3 Target Areas for Research | | | | | | | | | | | | | | | | | | | | | |
| 1 Engage NASA MSFC Vision | | | | | | | | | | | | | | | | | | | | | |
| 2 Engage Commercial Space Vision | | | | | | | | | | | | | | | | | | | | | |
| 3 Engage Military Leaders Vision | | | | | | | | | | | | | | | | | | | | | |
| G2 Focus Research | | | | | | | | | | | | | | | | | | | | | |
| 1 Opportunity Discovery | | | | | | | | | | | | | | | | | | | | | |
| 1 Encourage Opportunity ID | | | | | | | | | | | | | | | | | | | | | |
| 2 Create Opportunity Review Team | | | | | | | | | | | | | | | | | | | | | |
| G3 Promote the PRC | | | | | | | | | | | | | | | | | | | | | |
| 1 Communication Plan | | | | | | | | | | | | | | | | | | | | | |
| 1 Implement Plan | | | | | | | | | | | | | | | | | | | | | |
| 2 Create Materials & Tools | | | | | | | | | | | | | | | | | | | | | |
| 2 Signature Events | | | | | | | | | | | | | | | | | | | | | |
| 1 Develop On-campus Event | | | | | | | | | | | | | | | | | | | | | |
| 2 Develop Off-campus Event | | | | | | | | | | | | | | | | | | | | | |
| G4 Develop People | | | | | | | | | | | | | | | | | | | | | |
| 1 Attract New Faculty | | | | | | | | | | | | | | | | | | | | | |
| 1 Contribute to Recruiting Materials | | | | | | | | | | | | | | | | | | | | | |
| 2 Prepare New Faculty Briefing on PRC | | | | | | | | | | | | | | | | | | | | | |
| 2 Student Support | | | | | | | | | | | | | | | | | | | | | |
| 1 Establish Support Budget | | | | | | | | | | | | | | | | | | | | | |
| 2 Promote Opportunities to Students | | | | | | | | | | | | | | | | | | | | | |
| G5 Enhance Facility | | | | | | | | | | | | | | | | | | | | | |
| 1 Create World-class Lab | | | | | | | | | | | | | | | | | | | | | |
| 1 Complete 5-S of Lab | | | | | | | | | | | | | | | | | | | | | |
| 2 Create/Update Lab Documentation | | | | | | | | | | | | | | | | | | | | | |
| 3 Remove for Visitors & Observers | | | | | | | | | | | | | | | | | | | | | |
| 2 Inform Elected Leaders | | | | | | | | | | | | | | | | | | | | | |
| 1 Develop Standard Tour | | | | | | | | | | | | | | | | | | | | | |
| 2 Create Invitation Schedule | | | | | | | | | | | | | | | | | | | | | |
| 3 Implement Invitation Plan | | | | | | | | | | | | | | | | | | | | | |

Propulsion Research Center Milestones Calendar

Quarter 1 Dec-2010

- G1.1.1 Completion and use of criteria for considering opportunities
- G3.1.1 Hiring communications expertise to implement the plan
- G3.1.2 Hiring communications expertise to develop communication materials
- G4.1.1 Recruiting materials creation and submission
- G4.1.2 Creation of briefing for candidates
- G4.2.1 Establishment of a budget account for student research support
- G5.1.1 Completion of 5-S effort on JRC

Quarter 2 Mar-2011

- G4.1.3 Creation of orientation for new professor

Quarter 3 Jun-2011

- G1.1.2 Completion of partner recruitment & promotion package for teaming

Quarter 4 Sep-2011

- G1.1.3 Completion of a competitor analysis
- G2.1.1 Established incentive plan for encouraging opportunities identification
- G4.2.2 Recruitment of students to PRC
- G5.1.2 Documentation of standard processes & safety information on systems
- G5.2.1 Draft of PRC tour itinerary

Quarter 5 Dec-2011

- G1.3.1 Meeting with NASA-MSFC Leader(s)
- G2.1.2 Recruitment of Opportunity Review Team, First meeting of Team
- G3.2.1 Draft Agenda for an on-campus event
- G5.2.2 Preparation of an invitation list

Quarter 6 Mar-2012

- G1.2.1 Draft of an event, recruitment of sponsors, hosting the first event
- G1.3.2 Meeting with Commercial Space company leaders
- G2.1.2 Commitment of resources to opportunity selected
- G3.2.1 Recruitment of sponsors for event
- G5.2.3 Kickoff of invitations

Quarter 7 Jun-2012

Quarter 8 Sep-2012

- G1.3.3 Meetings with leaders in each branch of military

Quarter 9 Dec-2012

Quarter 10 Mar-2013

Quarter 11 Jun-2013

Quarter 12 Sep-2013

G1.2.2 List of industries to target, confirmation of first sponsor, placement of first student project

G5.1.3 Securing funding for renovation

Quarter 13 Dec-2013

Quarter 14 Mar-2014

Quarter 15 Jun-2014

G5.1.3 Design of renovated JRC facility

Quarter 16 Sep-2014

G4.2.2 Graduation of students supported in PRC

G5.1.3 Start of JRC renovation

Quarter 17 Dec-2014

Quarter 18 Mar-2015

G3.2.2 Collaboration agreement executed with other organization(s)

Quarter 19 Jun-2015

Quarter 20 Dec-2015

G5.1.3 Completion of JRC renovation