

Reference No:11		
Product Title:	DC-DC Converter Reliability	
Program Group	Electronics Parts Project	
Proposing Center	LaRC	
Participating Centers	GSFC, JPL	
Points of Contact:	JPL: Linda Facto GSFC: Ashok Sharma LaRC: Otis Riggins	818-354-2195 301-286-6165 757-864-3807
Performance Period:	FY00-FY01	
Program Objectives:	<ul style="list-style-type: none"> • Identify DC-DC converter suppliers whose assembly, materials, and processes are acceptable for space flight devices • Evaluate current and emerging dc-dc converter types for radiation, random vibration, and as necessary, electrical performance • Publish list of preferred suppliers and technologies for DC-DC converters for each major category of NASA applications • Publish reliability assurance guidelines for DC-DC converters for NASA applications 	
Approach:	<p>On-site assembly line evaluations will be conducted at DC-DC converter suppliers whose products have potential use on several NASA projects. This effort will include suppliers of hybrid devices, as well as suppliers of potted, non-hermetic devices. DC-DC converter samples from potentially acceptable suppliers will be subjected to destructive physical analysis, random vibration testing, and other characterization as appropriate. Although thorough radiation testing is not proposed for this task, radiation test results from other sources will be incorporated into the documentation for this task. Limited radiation testing may be performed as part of this task, as deemed necessary.</p> <p>In addition to detailed evaluation reports, a matrix will be developed to summarize major findings and selection criteria across suppliers. Anticipated NASA missions will be grouped by radiation environment, lifetime, and cost/schedule philosophy. Preferred suppliers and converter families for each major mission grouping will be identified. This information will be made available on a website accessible to NASA project users.</p> <p>A NASA DC-DC converter reliability assurance guidelines document will be generated. This document will include lessons learned from the supplier line evaluations, DPAs, other evaluations, and project experiences. Screening and qualification guidelines will be discussed in the document.</p>	
Benefits:	<p>This joint proposal with JPL, GSFC, and LaRC will primarily benefit NASA codes S, Y, and M.</p> <p>Due to size, weight, cost, and schedule constraints, increasing numbers of</p>	

	<p>NASA projects are utilizing off-the-shelf DC-DC converters, rather than custom designed PWB power supplies. Numerous assembly, materials, process, and radiation issues have been experienced on NASA projects with hybrid DC-DC converters, including converters from both QML and non-QML suppliers. Although exposure to these problems can be reduced through careful evaluation of suppliers and devices, NASA project design cycles often do not allow time for extensive evaluations prior to converter selection deadlines.</p> <p>This task will be structured to allow determination of acceptable suppliers and device types to satisfy a wide variety of anticipated space projects. In addition, current users of certain converter types will benefit from the identification and resolution of issues during the efforts of this task. Development of a preferred supplier list, and a summary of major selection criteria, will enable faster, lower risk selection of DC-DC converters for NASA and its contractors.</p>		
<p>Deliverables:</p>	<p>The results of this task will have the following deliverables:</p> <ul style="list-style-type: none"> • Evaluation reports from on-site supplier line evaluations, DPA, radiation, and other environmental testing • Matrix summarizing major selection criteria for DC-DC converters across suppliers • Listing of preferred DC-DC converter suppliers for each grouping of NASA missions 		
<p>Schedule:</p>	<p>Com- pletion</p>	<p>Task</p>	<p>Responsible Center(s)</p>
	<p>1Q00</p>	<p>Generation of criteria for inclusion in selection matrix</p>	<p>GSFC, LaRC, JPL</p>
	<p>2Q00</p>	<p>Line evaluation reports for candidate suppliers</p>	<p>JPL</p>
		<p>Draft summary matrix</p>	<p>GSFC, LaRC</p>
	<p>3Q00</p>	<p>DPA and random vibration reports</p>	<p>JPL</p>
	<p>4Q00</p>	<p>Completed summary matrix</p>	<p>GSFC, LaRC</p>
		<p>Listing of preferred suppliers</p>	<p>GSFC, LaRC, JPL</p>
	<p>2Q01</p>	<p>Radiation test reports (if testing necessary)</p>	<p>GSFC, JPL</p>
	<p>3Q01</p>	<p>DC-DC converter reliability assurance guidelines document</p>	<p>GSFC, JPL, LaRC</p>
<p>Partners/Collaborators:</p>	<p>JPL, GSFC, LaRC, Lockheed Martin, and DC-DC converter suppliers such as Lambda Advanced Analog, Interpoint, Magitude-3, Analog Devices Inc., Datel, Apex, and others.</p>		