C-17 Success: Microcircuit Emulation with GEM

**System**
C-17 Globemaster III (WSDC DTF)

**Role:** Strategic and Tactical Airlifter  
**Produced:** 1991 – 2015  
**System Manufacturer:** Boeing  
**Date Deployed:** June 1993  
**Number Built:** 279  
**Number in Service:**  
  - Active Duty: 157  
  - Air National Guard: 47  
  - Air Force Reserve: 18  
  - Foreign Military: 56

**Emulation Support**
The expected system service lifetime of the C-17 reaches out until 2040*

There are 27 GEM NSNs used in the C-17 weapon system

The DLA Emulation Programs have saved C-17 at least $30M in cost avoidance**

* Source: Air Force Scientific Advisory Board/Photos: Defense Dept  
** Last updated November 2019
DLA Emulation Example

<table>
<thead>
<tr>
<th>Application</th>
<th>C-17 Landing Gear</th>
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</thead>
<tbody>
<tr>
<td>Emulation Solution</td>
<td>In this application the device is only programmed once therefore the GEM program was able to provide a Form, Fit, Function and Interface (F3I) hard-coded ASIC replacement for the obsolete programmable microcircuit. For the last 17 years, the GEM Program has provided 89 delivery orders of over 400 individual parts. The GEM33320BXC part is still actively available.</td>
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<td>Customer</td>
<td>Crane Hydro Aire, a subcontractor for Boeing, has successfully used the GEM Program Emulation of a programmable device.</td>
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<td>Benefit to Program</td>
<td>Eliminate system redesign due to part’s obsolescence, and provide long-term production support.</td>
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Our Story

In the late 1980’s, DLA recognized that microcircuit obsolescence threatened the readiness of many American defense systems. Numerous systems in the armed forces were designed and developed in the 1960’s and 1970’s. For example, the U.S. Air Force began flying the F-15 Eagle tactical fighter in 1972, and the U.S. Navy first tested the Aegis phased-array radar at sea in 1973. Because of continued advancements in semiconductor technology, the original suppliers stopped manufacturing the microelectronic components used in these and other systems. In 1987, DLA contracted with SRI to begin research and development on how to best replace obsolete microcircuits with standardized, modern integrated circuits (IC). DLA and SRI collaborated to develop the GEM Program. Using its on-site Trusted semiconductor foundry and deep knowledge of IC design/development, SRI produces on-demand, Class Q microcircuits matching the Form-Fit-Function-Interface (F3I) criteria of the required microcircuit. DLA is developing the next generation of F3I microcircuit Emulation capability through the AME Program to further alleviate growing IC obsolescence issues caused by the continued rapid advancements in technology. The new capabilities developed by AME are utilized by the GEM Program to ensure the Emulation Programs continue to meet weapons systems wide-ranging requirements. SRI’s semiconductor foundry is accredited as a Department of Defense (DoD) Trusted Foundry supplier, and our manufacturing processes are qualified to MIL-PRF-38535.