

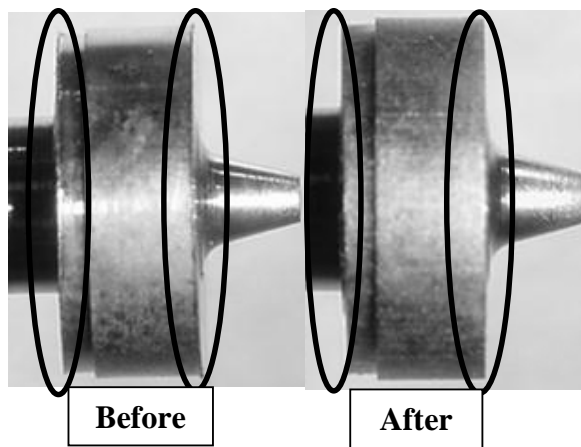
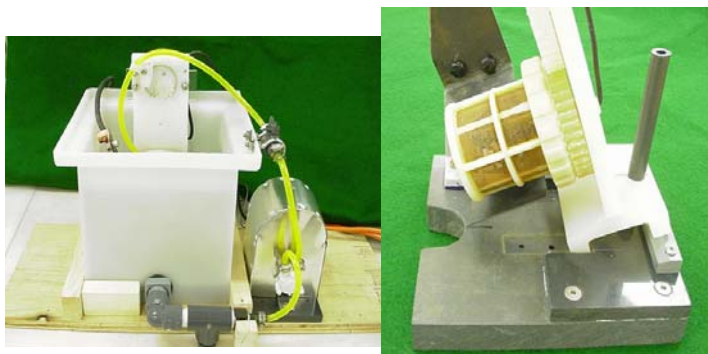
## Edge Finishing of Small Parts using the *Faradayic* Process

### Objective:

This project demonstrated the feasibility of using the patented *Faradayic* Process to remove burrs on small parts.

### Summary:

The *Faradayic* Process is used to cost-effectively finish small, advanced engineering/passive material parts, such as aluminum, titanium, and stainless steel. These parts would generally be defined as those with dimensions of *less than 1 cubic inch*. The processing set-up consists of a mini electroplating barrel retrofitted for the selective metal removal process. The slow rotation speed of the barrel is designed to enhance the contact between the small parts in the barrel for electrical conductivity purposes. Additionally, since the rotation speed is slow and requires no vibration, surface contact, and subsequent damage of the part, is minimal. The *Faradayic* Finishing Process successfully removed the edge defects illustrated on the part produced from the prior machining operation. The *Faradayic* Process incorporates a non-uniform current distribution to preferentially remove the edge defects protruding from the surface of the part, without damage to the main body of the part.



### Background:

The patented *Faradayic* Process is an electrochemical manufacturing technique that utilizes a controlled electric field to either polish or shape a metallic work piece. Since the *Faradayic* Process is electrically mediated, it does not require aggressive chemicals to facilitate the metal removal as needed in conventional chemical processes (e.g. chemical etching). The material removal rate is determined by the applied electric field, which is user-defined and computer controlled. This provides the means for precise control of the length of the process and the total material removed. Additionally, the use of neutral salt solutions (e.g. sodium chloride and sodium nitrate) as the electrolyte makes the process both worker and environmentally safe.

The *Faradayic* Process technology illustrated above is protected by a substantial patent portfolio including issued, allowed, and pending patent actions.