

## **Developmental Techniques of FED Device for Avionics**

**\*L. M. Rangarajan, Sanjeev Kumar, Permander Malik, Navit Rana  
Kamal Kant Kaushik, Piyush Dua, Ashok K Chauhan**

Amity Center for Vacuum and Advanced Technologies, Amity University, Uttar Pradesh 201301

\*lmrangarajan@aint.amity.edu

### **Abstract**

Field emission display device looks like a credit card. Earlier, the field emitters are molybdenum microtips, SI diamond tips and with MIM technology emitters are assembled. A novel method of SWNT (Single Walled Carbonnanotubes) give stable electron beam currents to 100 mAmps for moderate fields. Development of anode glass plate with scan electrodes, dielectric layer, barrier ribs and phosphor screen is carried out. The cathode plate with ITO address electrodes and CNTs on silicon wafer with a gating electrode is prepared. The silver chloride seal for joining silicon wafer to glass plate is successfully introduced. Frit sealing of both top and bottom glass plates with spacers, evacuation tubulation complete the assembly.

The most critical process parameters of FED device are ultra high vacuum processing, RGB phosphor deposition and drive electronics for sequential scanning of the image. A new multiport UHV Chamber pumped by triode sputter ion pump system for the study of FED components at  $10^{-9}$  torr and less is described. The RGB phosphor particles are of submicron size and less electron beam energy of 600v approximately is sufficient as penetration depth is also reduced. Hence, screen deposition methods are radically different from CRT methods. The Fowler –Nordheim plot shows the field at CNT tips is as high as  $10^7$  v/cm. The drive electronics waveforms for 32 pixel, 64 pixel and 256 pixels are shown. This FED device will be used in the cockpits of tree top flying planes as well as in mobile phones for imaging purposes. Futuristic FED devices will use GNF emitters and nanophosphors.