

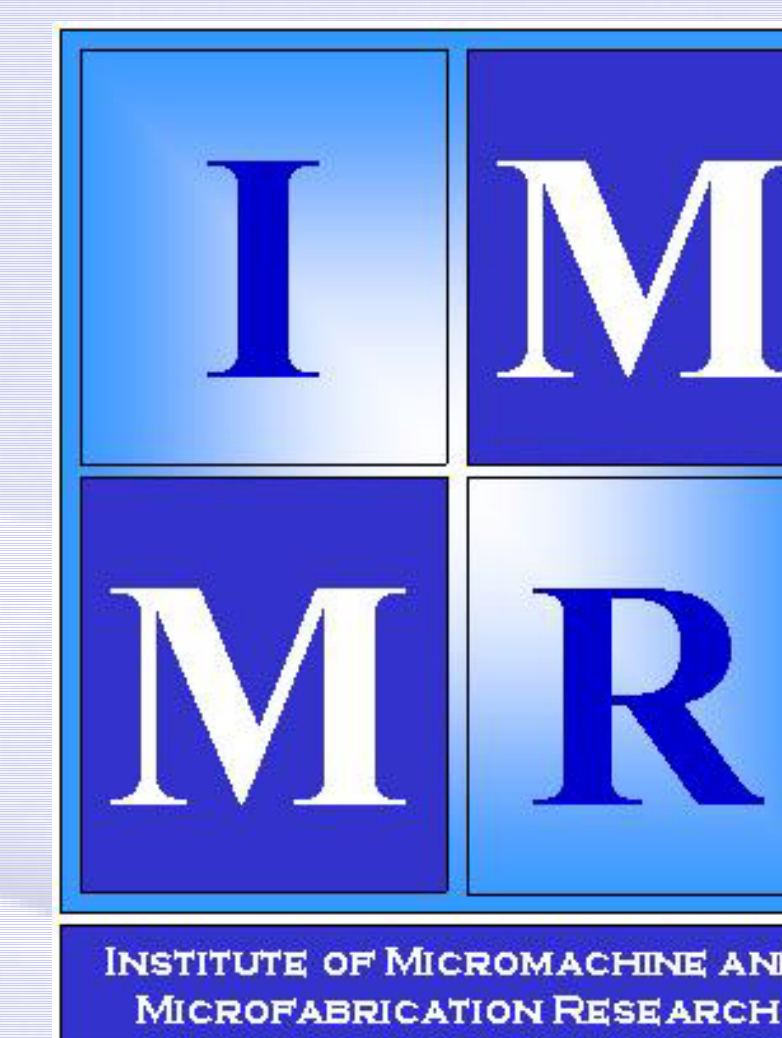
CIF2SVG Converter:

A Web Publishing Tool for Micromachining and Integrated Circuit Technology

Hanjin Cho (hcho@sfu.ca) & Ash M. Parameswaran (param@cs.sfu.ca)

Institute of Micromachine and Microfabrication Research

School of Engineering Science, Simon Fraser University

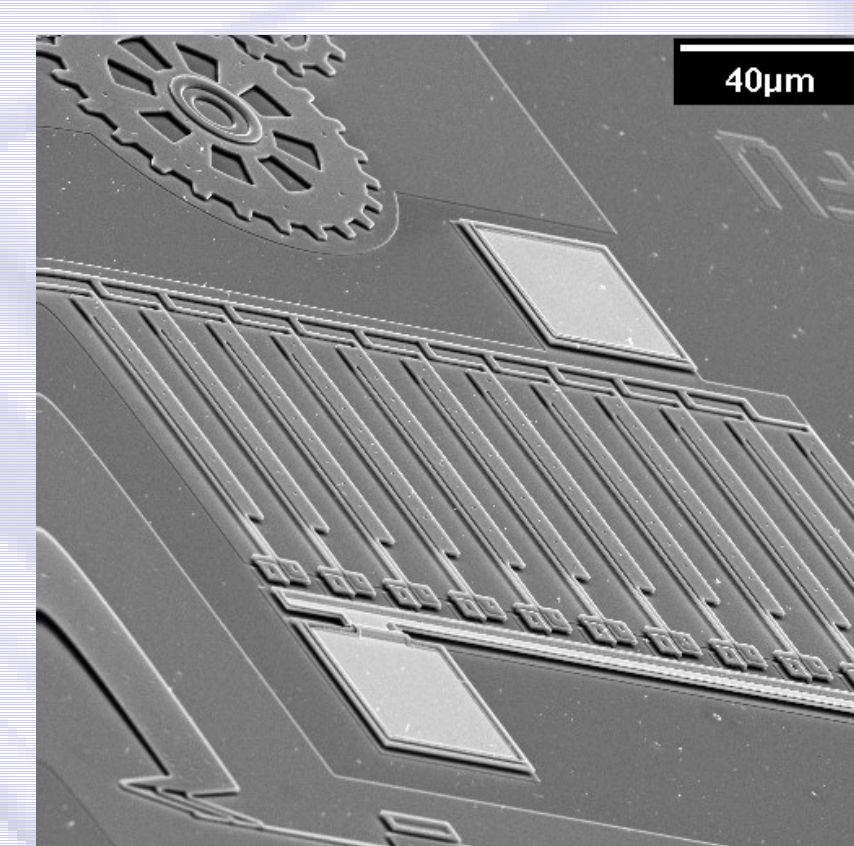


Introduction

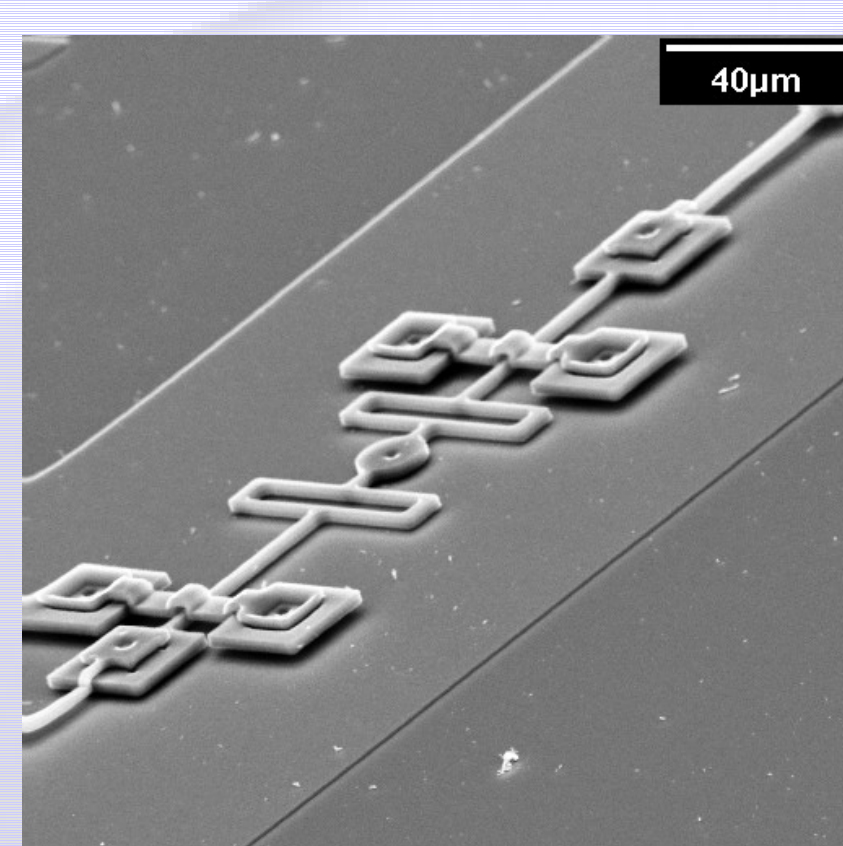
Micromachining and MEMS, offshoots of integrated circuit technology are revolutionizing the modern day instrumentation.

Micro-Electro-Mechanical Systems (MEMS) are micro-scale devices on the silicon wafers that integrate novel sensing and actuation functions with traditional microelectronics-based data processing and control systems. They integrate mechanical elements, sensors, actuators, and electronics on a common silicon substrate.

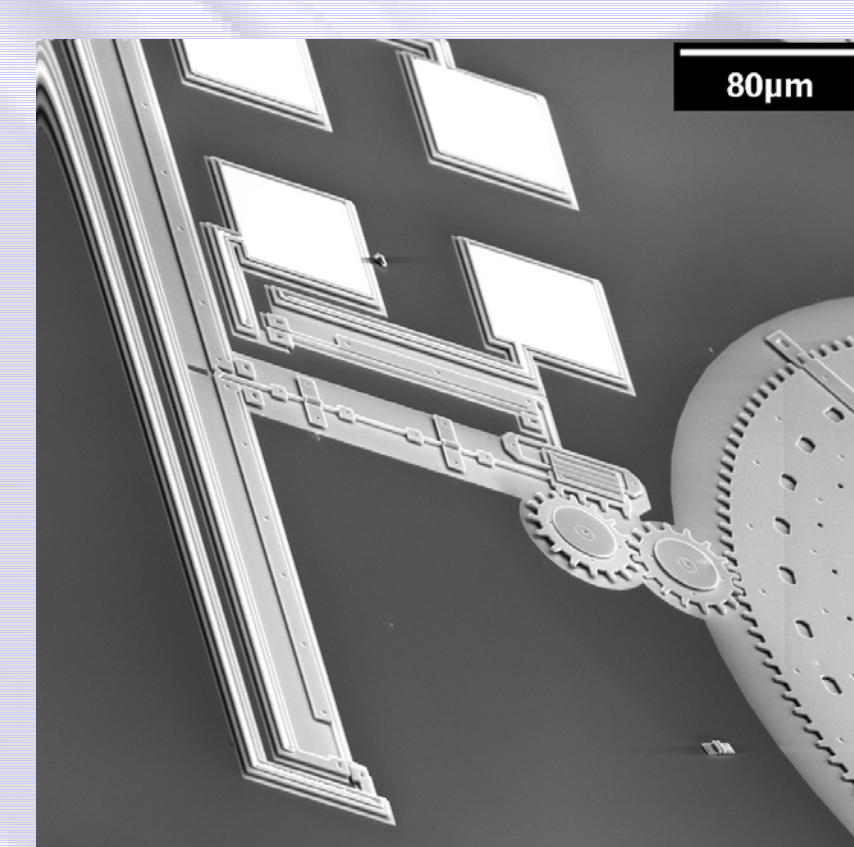
The micromechanical components are fabricated using compatible micromachining processes that selectively etch away parts of the silicon wafer or add new structural layers to form the mechanical and electro-mechanical devices.



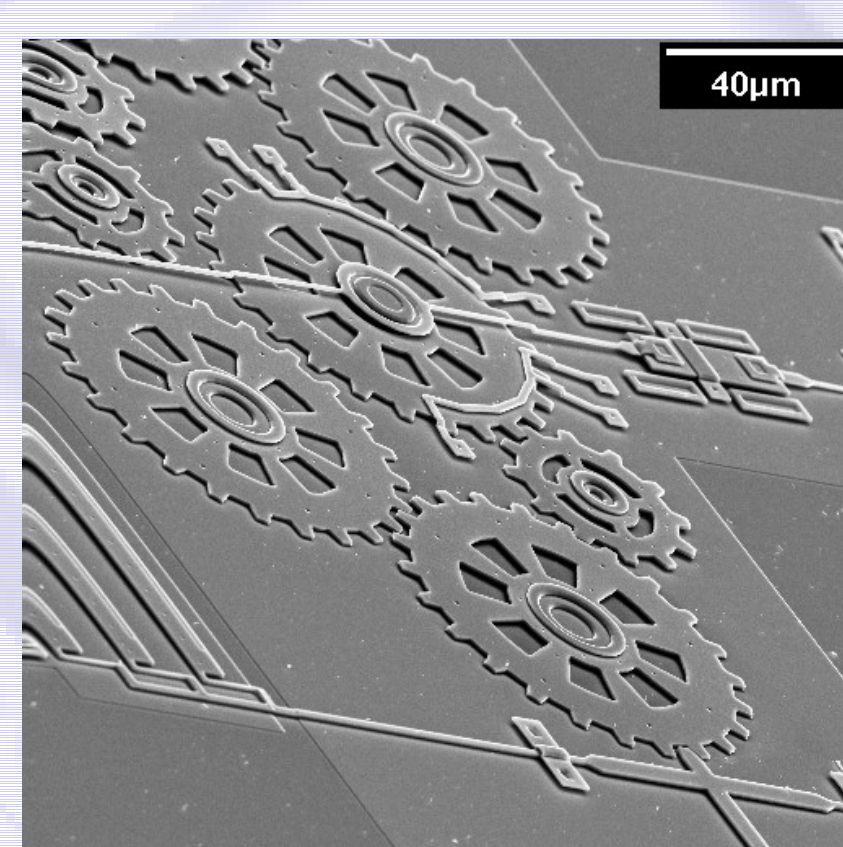
(a) Heatuator Array



(b) Box Spring



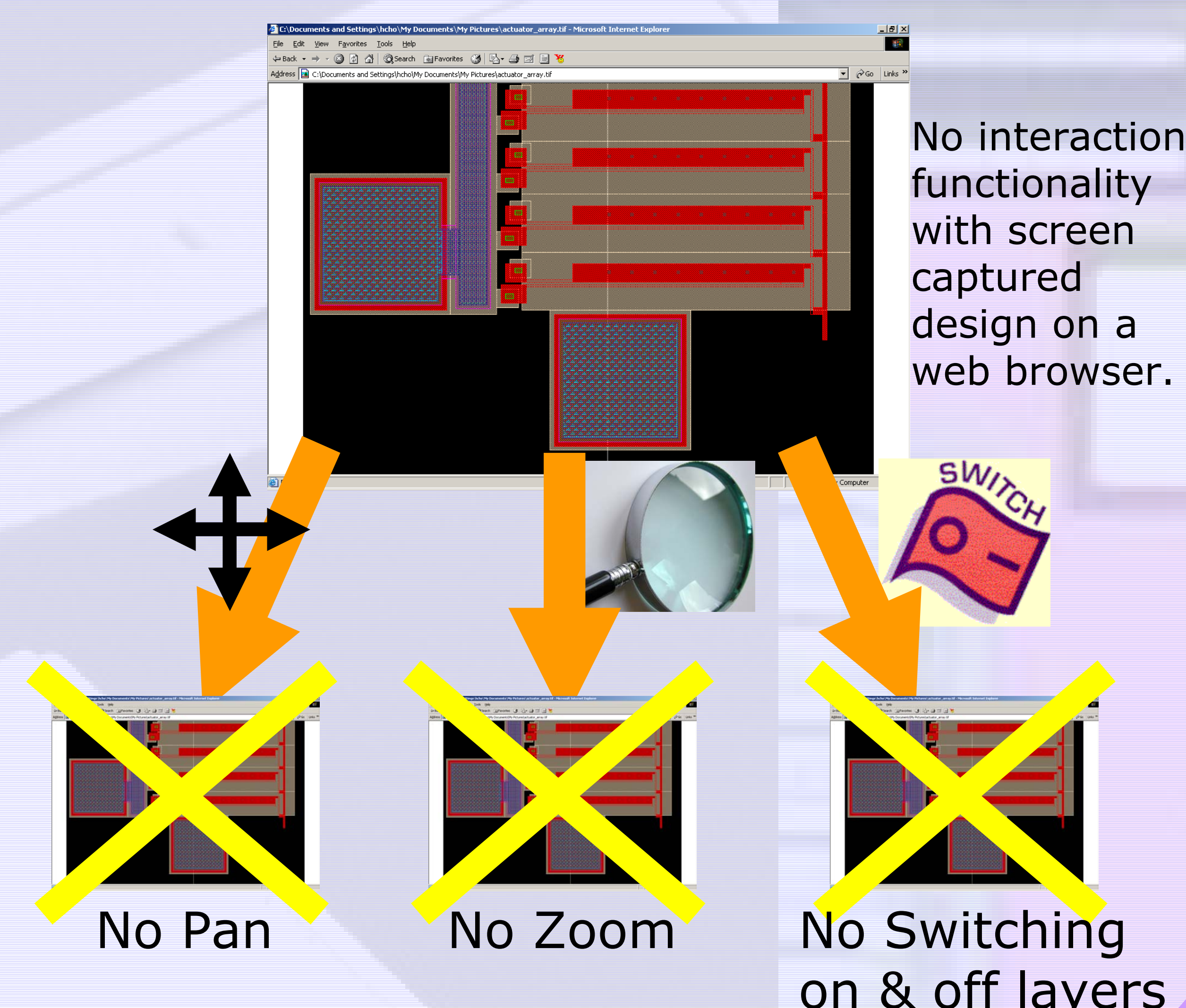
(c) Shutter Motor



(d) Reversible Gear Train

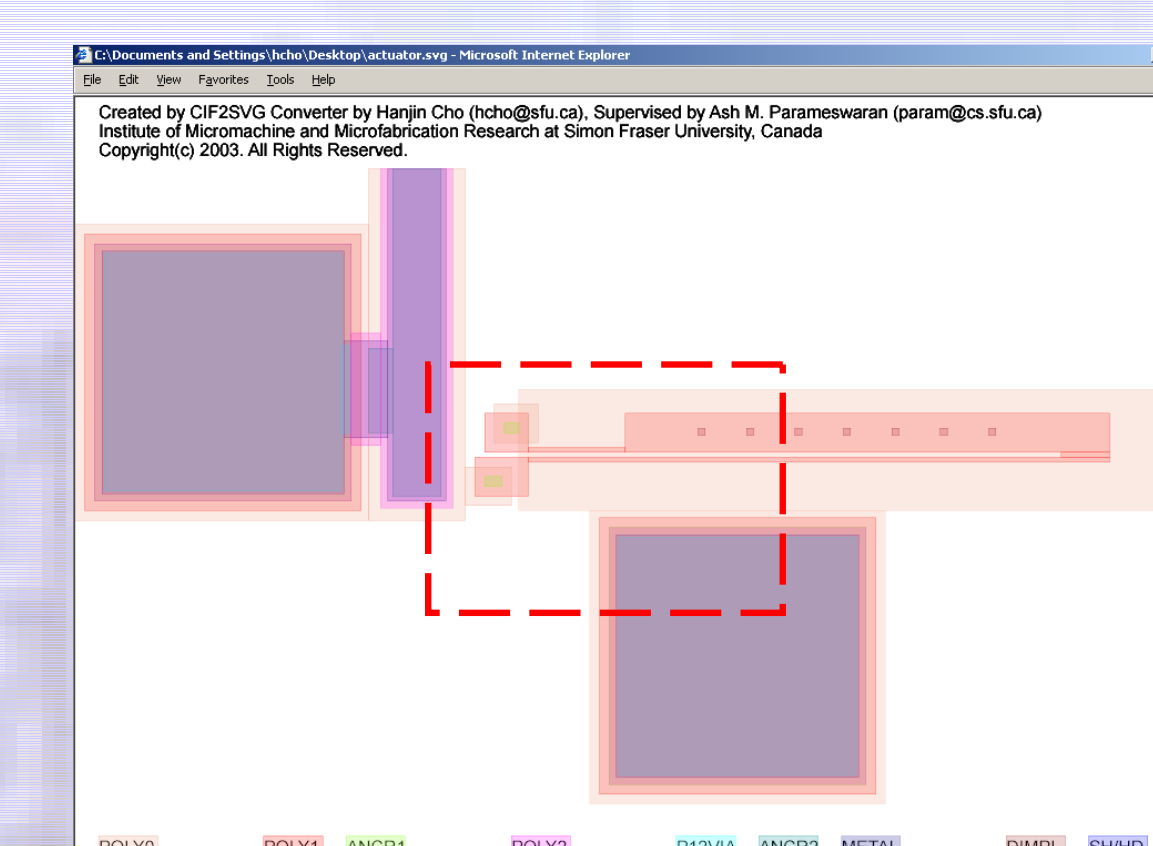
Motivation

Particularly for micromachining, visualization of the intended device is very important. Currently, to enable good visualization various features such as pan, zoom, and rotation are available only in expensive industrial MEMS CAD software packages. Moreover, presenting micromachine designs on the web is usually done by capturing the image of the design on the screen and embedding the image into a HTML document. This manual process of capture-and-paste is a time-consuming task and often cannot illustrate detailed information of the design. Because the resolution of the screen-captured image is fixed, the image cannot be zoomed in and out interactively. Thus, if more detailed information were required for certain area of the design, several screen shots have to be taken for each zooming step.

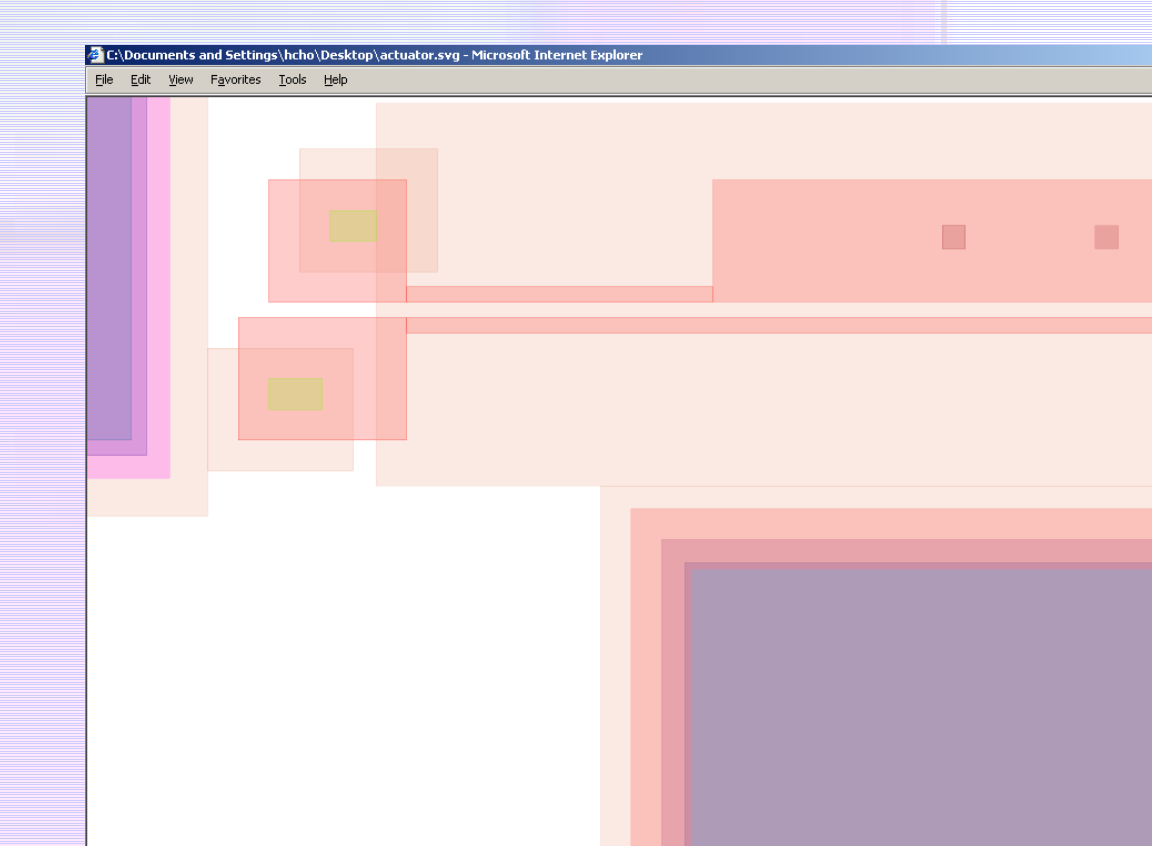


CIF2SVG Converter

In the design of micromachines as well as integrated circuit devices, design data is most commonly communicated using a file format called Caltech Intermediate Format or CIF. We developed a software named CIF2SVG that enables users to automatically convert CIF files to SVG. Our software extracts geometry data from a CIF file and generate a faultless output in the SVG format. The converted design in SVG format can be viewed using a SVG viewers. In the SVG viewer, designers can perform various display features such as panning, zooming and switching on and off photomask layers. You can try out CIF2SVG converter online at <http://cgi.sfu.ca/~hcho/cgi-bin/cif2svg.cgi>



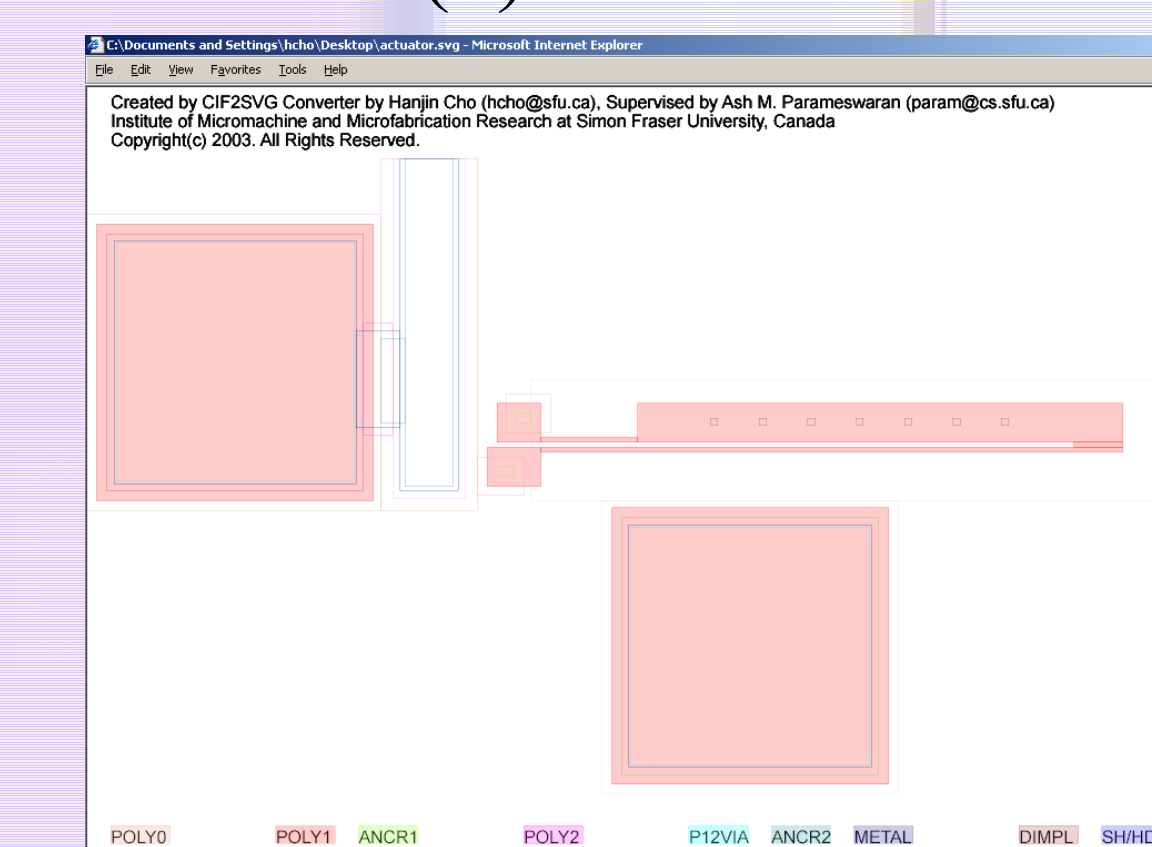
(1) Heatuator



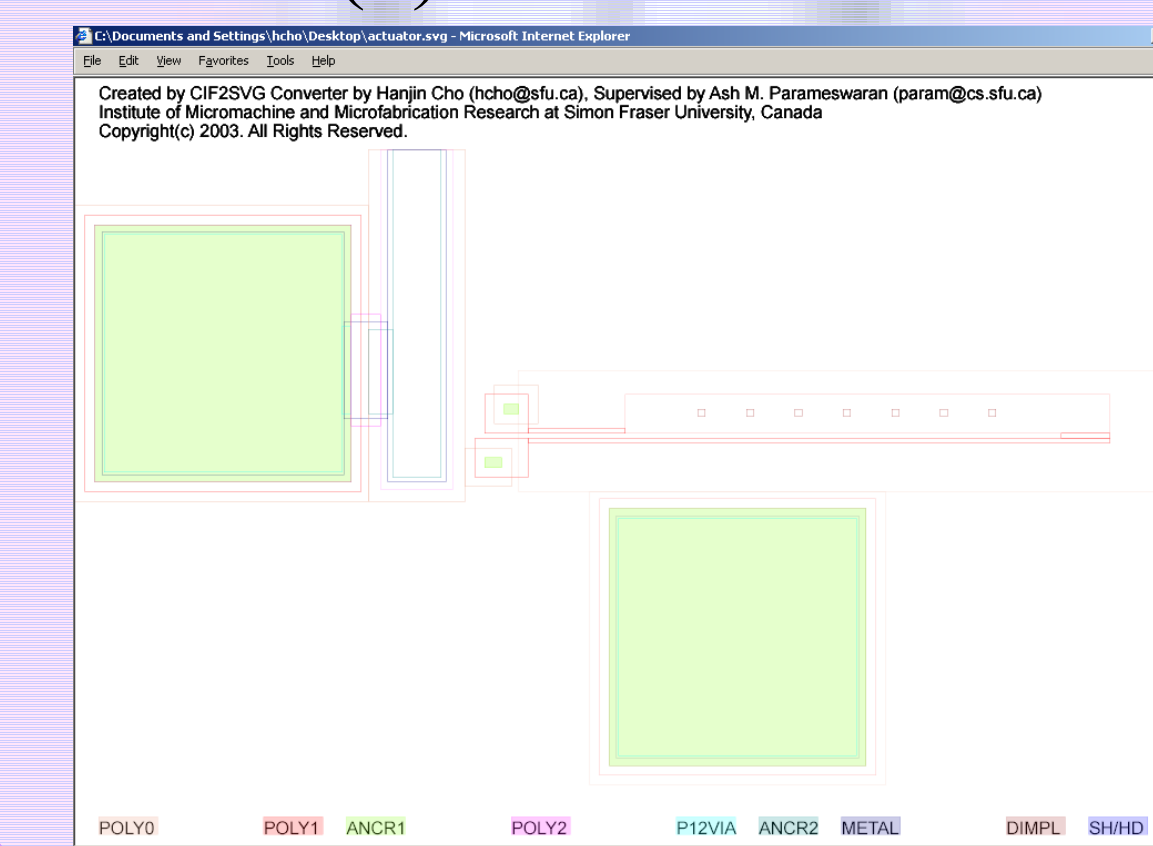
(2) Zoom-In



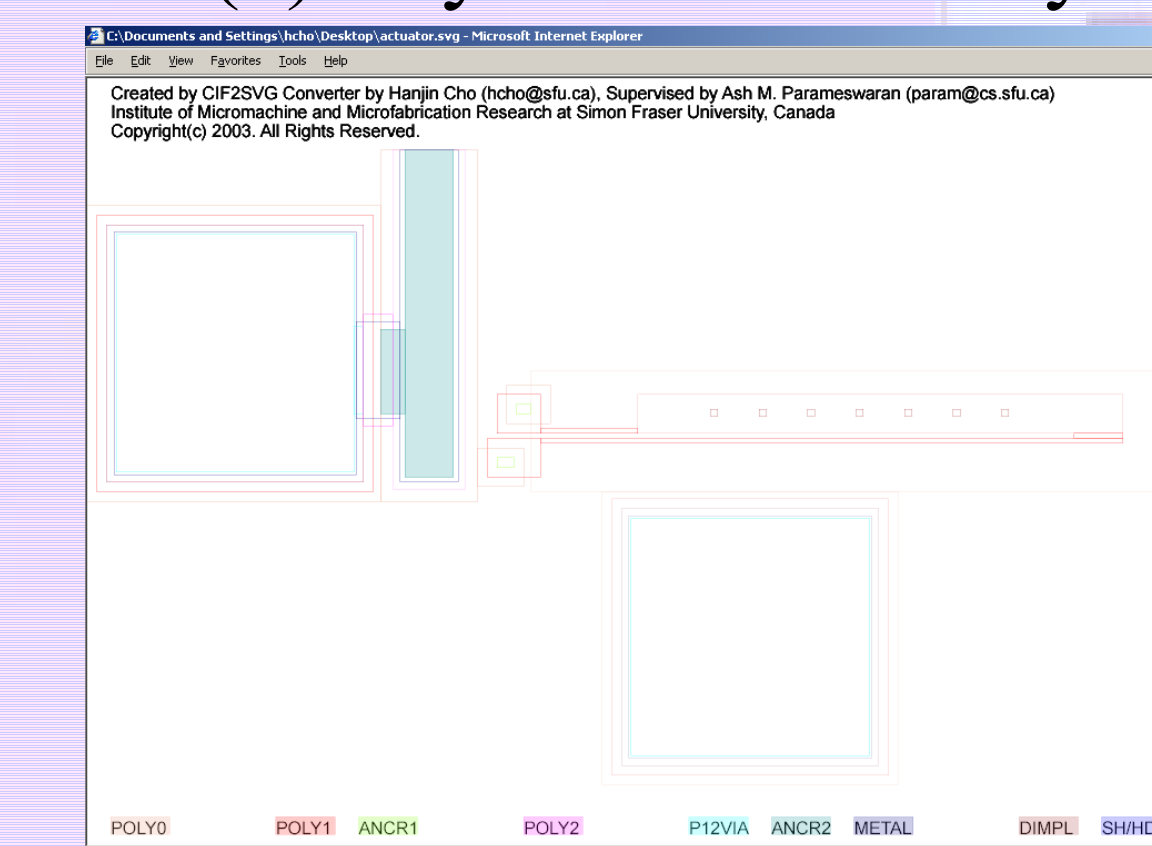
(3) Zoom & Pan



(4) Layer POLY1 Only



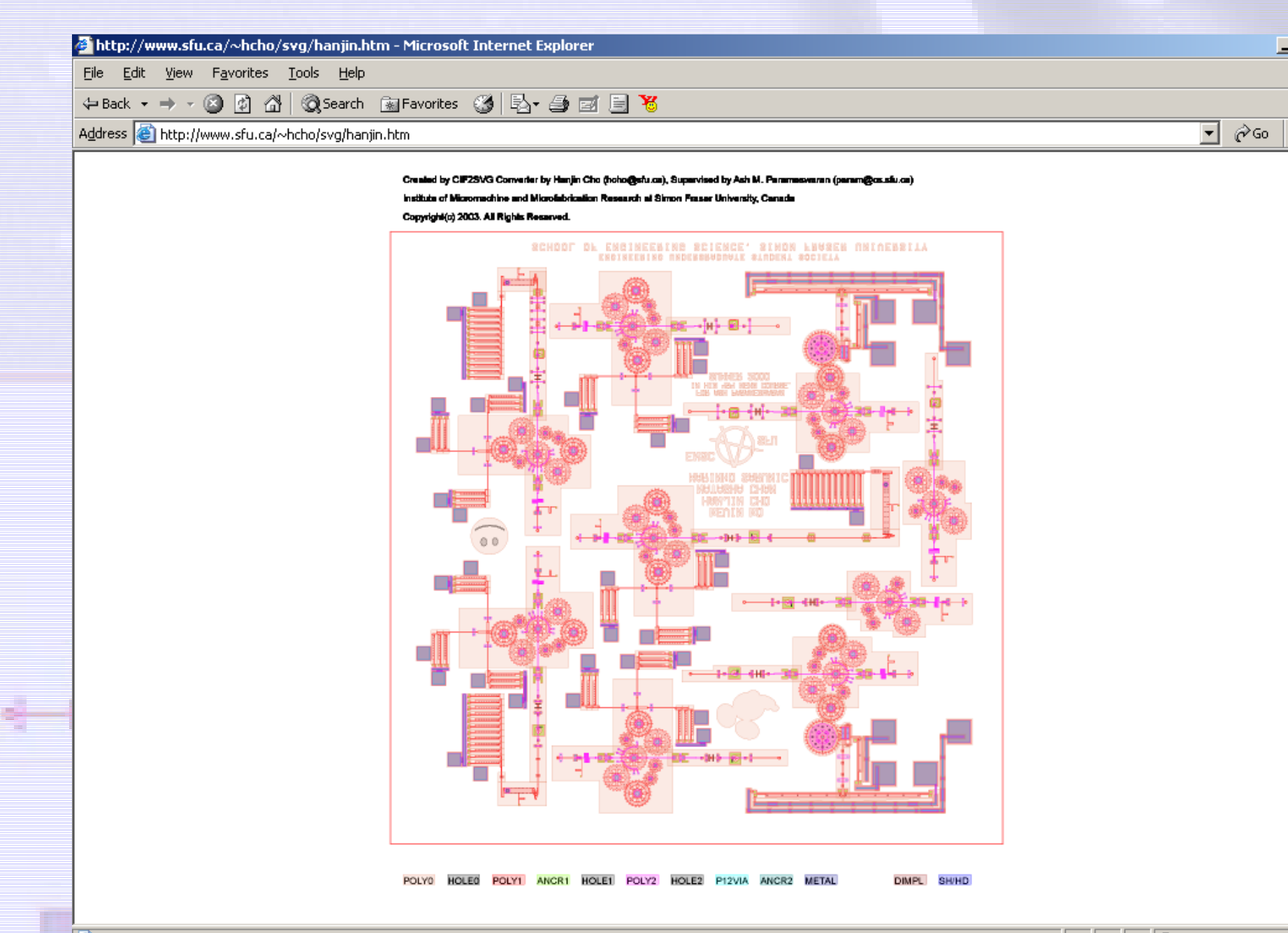
(5) Layer ANCHOR1 Only



(6) Layer ANCHOR2 Only

Benefits

CIF2SVG provides a simple solution to designers for publishing and presenting micromachine and integrated circuit designs on the web. By utilizing a web-browser based SVG viewer, remote access to design viewing and design verification can be done. This remote access feature will enable collaborations between research groups across the world.



Since the converted design data is in SVG format, any text editor can be used to modify the design rather than using expensive and complicated MEMS CAD software.

