

## Session 10 - Lab on User Programs

**Files: C:\Advanced SIMION Class\10. User Program Introduction\Lab**

### Modifying an Existing User Program

The best way to start programming is to steal, steal, steal.

1. Remove all PAs From RAM
2. From View load the file tune.iob from directory  
**C:\Advanced SIMION Class\10. User Program Introduction\Lab**
3. Fly the ions. Note the tuning voltage displayed in the data window. Compare this with the voltage on the middle electrode in the view screen. Why are they different?
4. Click the PAs tab and then the Dbug button to get to the User Program file screen.
5. Click edit to see the user program in EDY. Find the Terminate Segment and using the Retain\_Changed\_Potentials variable modify this segment so that the last potential used is kept and displayed in the view screen. Save your changes (Exc, S, Y) then alt tab back to the user program screen and compile the altered program. If it compiles, quit back to SIMION and fly the ions again.
6. Now compare the voltage displayed in the data window with that in the view window for the middle electrode. They should not agree. Why?
7. Now fly the ions on a Potential Energy surface. Compare the voltage displayed in the data window with that in the view window for the middle electrode. They should agree. Why?
8. Get to the ion definition screen and increase the number of ions being flown to 15 for each group.
9. Fly the ions with a goal of  $1 \text{ e-}5$  and time how long it takes to complete all trajectories. (It will abort after 20 iterations). Write down the time.
10. Get back to the User Program screen, and then into the user program in EDY.
11. Modify the program to use the Init\_P\_Values segment instead of Fast\_Adjust to set the voltage. (Hint, put ; at the beginning of the lines in the Fast\_adjust segment that change the voltages, and add a Segment Init\_P\_Values just below it, adjusting the same electrode.)
12. Save your changes, compile the program and fly the ions using the same goal value ( $1 \text{ e-}5$ ). Time how long this version takes to run through 20 iterations. Why is it faster?
13. Use manual fast adjust to set the middle electrode to 300 volts. Now fly the ions in a 2D (xy) view using Init\_P\_Values. Compare the voltage displayed in the data window with that in the view window for the middle electrode. They should agree. Why?

Explain what is going on! Hint: Under what conditions does the potential of the entire array change under program control?