SPME 430 Biomechanics
Basic Data Collection - Motion Analysis System

WHAT DOES THE SYSTEM DO?

1. It collects coordinate data from markers placed on a subject using the 6 cameras in the lab. The cameras have the ability to sample at a rate between 60 and 240 Hz.
2. Using the coordinate data from each camera and for each marker, together with some calibration constants obtained prior to the start of the data collection, the system computes the 3D coordinates of each marker in terms of a laboratory-based, inertial, orthogonal reference system.
3. The system allows for editing of the coordinate data.
4. The system will compute a host of kinematic data for each marker. An additional software package will perform a wide variety of kinematic and kinetic calculations.
5. Additionally, the system can collect and analyze EMG and force plate data.

GUIDING PRINCIPLES

These principles are inviolate! Failure to heed these precepts will result in a host of problems, most of which will have the following end results: a) damage to the motion analysis system or its data files; b) corruption of the biomechanical data obtained; c) abhorrent behavioral symptomology in the class professor; and d) probable decrease in your course grade.

1. Never touch or move a camera.
2. Always log off (exit) the Motion Analysis computer when you are finished and follow the shut down procedures.
3. Never give the class ID and password to non-class members.
4. Never have drink or food on any table containing computer equipment.
5. Always turn off all cameras, video monitors, computer monitor(s), computer printer(s) and computers when finished.
6. NEVER leave the door to the Biomechanics Lab open if the lab is unoccupied.
7. Always lock the door to the Biomechanics Lab if you are the last person to leave.

USING THE SYSTEM

The Motion Analysis system runs on two computers: the first computer (Peppermint) has a Windows 2000 computer operating system and will behave much like a Windows XP system; the second computer (Midas) is a DOS based system. While you can point and click your way through most "basic computer tasks", you will need to pay close attention to detail and all instructions when using the system. In addition, the EVA program that we will use to collect data is very detail oriented, so be certain to follow all instructions carefully.

DATA COLLECTION

1. Turn on the following items
   A. The bottom or lower "Brown" monitor
   B. Dell computer monitor
   C. 4 small monitors in the rack
   D. Strobe lights on each camera – use the power strip on top of the UPS to turn on all cameras.
   E. On the counter, turn on the inkjet printer – DESKJET 1600 CM.

2. Turn on the peppermint computer.
   A. Select the first option during startup (Select Windows 2000 Operating System) by pressing the Enter (↵) key or wait for the timer to count down.
   B. Allow the system to start. When the start up is complete, you will see a screen that says "press CTRL-ALT-DEL to log on".
   C. **CTRL-ALT-DEL**
   D. Enter your user name. The user name for our class is SPME430
   E. Enter your password. The password for our class is Biomechanics
   F. **OK**

3. Once you have logged onto the peppermint computer successfully and you see the windows desktop:
   A. If the MIDAS computer is off (you do not hear the fan), turn on the MIDAS computer.
   B. If the computer monitor on top of the Motion Analysis System video cart does not come on when you turn on the MIDAS computer, turn on the computer monitor located on the top of the Motion Analysis System video cart.
   C. When prompted for a password, type "midas" and press the Enter (↵) key.
   D. Next, you should see a screen full of data scroll past and the data will be bounded by lines that read,
      "Begin ---- System Initialization " & "End ----- System Initialization End" at the top and bottom of the data section, respectively.
   E. You will not have to use the MIDAS computer for any additional operations.

4. Double-click the Eva7.0 icon on the peppermint computer's desktop.

5. Window "Eva7.0 3D/2D" will appear. This is the main EVa window.

6. **File – Load**
   A. File Type – Project
   B. Select correct project file from the files list by single-clicking on the file name. The file name will appear in the Selection box.
   C. Load – Complete Project
   D. **Load Project**

   For this project, your project name is _____.

7. You should get the message – "A complete Project has been successfully loaded" at the bottom of the Eva Load Files window. If not, repeat step 6.

8. **Close**

9. **Acquire – Acquire**

10. Should have the following settings in the Eva Video Acquisition Menu
    A. Video Setup
        1. Trigger – On Host
        2. Inc. Trial # - Yes
        3. Display Data – Yes
        4. All 6 video channels Active – the square (under the Active column) is gray.
        5. Mode – Camera Direct
        6. Collecting – Trial Data
        7. Monitor Type – Electrohome
        8. Frame Rate – 120
        9. All other items will default to correct settings.

11. If you are not collecting analog (force plate or EMG) data, skip to step 13. Otherwise, **Video Setup - Analog Setup**

    Instructions for collecting analog data will be inserted here

12. **Analog Setup – Video Setup**

13. You are ready to collect data, prepare the subject (this should have been done in advance).

14. When the subject is ready, you may continue.

15. Collect the neutral trial.

    A. Have the subject stand facing in the positive X direction and in the center of the calibrated area.
    B. The subject should attempt to approximate the anatomical position, but make certain that no markers are blocked by their body in the view(s) of more than one camera.

16. Click in the box – Trial Name. Type the name for your trial, make certain the file name ends with neutral (N) or Static(S).

17. Click on the arrows for the trial number box. Reset the trial number to 1.

18. **Collect**

19. If you are using the name of a previously named trial, you will get a message indicating that you will overwrite the previous trial. Click either **OK** or **Cancel** as appropriate.

20. If you answered OK to step 19, you will immediately start collecting data.

    If you did not get the message discussed in Step 19, **Start**.

    Data collection will begin.

21. You are now at the Eva Raw Data View Screen

    A. Display options, click to change
    B. Play forward
    C. Make certain that all markers appear visible in the camera views.

22. If data appear correct, go to step 23. If not, return to step 14 and attempt to collect the trial again.

23. Close the Eva Raw Data View screen. *Press the X in the upper right-hand corner of the window*.

24. Begin collection of the trial data.

    Remove any “joint center” or "stationary" or “neutral” markers that were used only for the neutral or static trial(s) from the subject.

25. Have the subject move to the starting position and give them final instructions. If possible, have them move in the positive X direction (in our lab, this is usually toward the sliding panel doors).

26. Click in the box – Trial Name. Type the name for your trial. Make certain that the trial name does not end in N or S, these initials were used to indicate a neutral or static trial in step 16.

27. Click on the arrows for the trial number box. Reset the trial number to 1.

28. **Collect**

29. If you are using the name of a previously named trial, you will get a message indicating that you will overwrite the previous trial. Click either **OK** or **Cancel** as appropriate.

30. If you answered OK to Step 29, you will immediately start collecting data.

    If you did not get the message discussed in Step 29, **Start**. Data collection will begin.

31. You are now at the Eva Raw Data View Screen
    A. Display options, click to change
    B. Play forward
    C. Make certain that all markers appear visible in the camera views.
    D. **Show analog** ---- Use this only if have collected analog data. In this analog view, just make certain that you see some values for each of the collected analog channels.

32. If data appear correct, go to step 33.
    If not, return to step 24 and attempt to collect the trial again.

33. Close the Eva Raw Data View screen. *Press the X in the upper right-hand corner of the window.*

34. Return to step 25 to collect additional trials.

35. When complete and all trial data "appears" correct, you are finished.

36. Close Eva Video Acquisition menu. *Press the X in the upper right-hand corner of the window.*

37. All trial data is saved automatically; however, it is good to save the project data at this time.
    A. In the Eva Main window:
    B. **File**
    C. **Save Project**
    D. Will get message indicating that the project was saved.
    E. **OK**

38. Close the Eva Main window. *Press the X in the upper right-hand corner of the window.*

39. **YES**

40. If you are done using the Motion Analysis System and someone is waiting to use the system (you only want to log out of the system), go to step 41.

    If you are done using the Motion Analysis System and no one is waiting to use the system (you want a complete shut down of the system), go to step 42.

41. A. **CTRL-ALT-DEL**
    B. **Log Off**
    C. **OK**
    D. You should see a screen saying "press CTRL-ALT-DEL to log on". If so, you have logged off successfully and can allow the next user to have access to the system.

42. A. **CTRL-ALT-DEL**
    B. **Shut Down**
    C. **shutdown**
    D. **OK**

43. Turn off all items listed in Step #1, Step #2, and Step #3.

44. Close the door to the lab on your exit.

If the system is turned on when you begin to use it, replace the instructions in steps 1, 2, 3 with the instructions that follow.

1. Make certain that the following items are on:
    A. The bottom or lower “Brown” monitor
    B. Dell computer monitor
    C. 4 small monitors in the rack
    D. Strobe lights on each camera – use the power strip on top of the UPS to turn on all cameras.

2. On the peppermint computer, you should see a screen that says "press CTRL-ALT-DEL to log on".
    A. **CTRL-ALT-DEL**
    B. Restart the computer.
    C. Select the first option during startup (Select Windows 2000 Operating System) by pressing the Enter (↵) key or wait for the timer to count down.
    D. Allow the system to start. When the start up is complete, you will see a screen that says "press CTRL-ALT-DEL to log on".
    E. CTRL-ALT-DEL
    F. Enter your user name. The user name for our class is SPME430
    G. Enter your password. The password for our class is Biomechanics
    H. OK

3. Once you have logged onto the peppermint computer successfully and you see the windows desktop. If the MIDAS computer is also on follow the instructions shown below. If the MIDAS computer is turned off, return to the original step #3.
    A. Make certain that the Computer Monitor on top of the Motion Analysis System video cart is on.
    B. **CTRL-ALT-DEL**
    C. When prompted for a password, type “midas” and press the Enter (↵) key.
    D. Next, you should see a screen full of data scroll past and the data will be bounded by lines that read,
        “Begin ---- System Initialization “ & "End ----- System Initialization End" at the top and bottom of the data section, respectively.
    E. You will not have to use the MIDAS computer for any additional operations.

4. Return to step 4 on page 2 of this handout.