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Boot Study I:
Data Organization and IISYS Session

User's Manual

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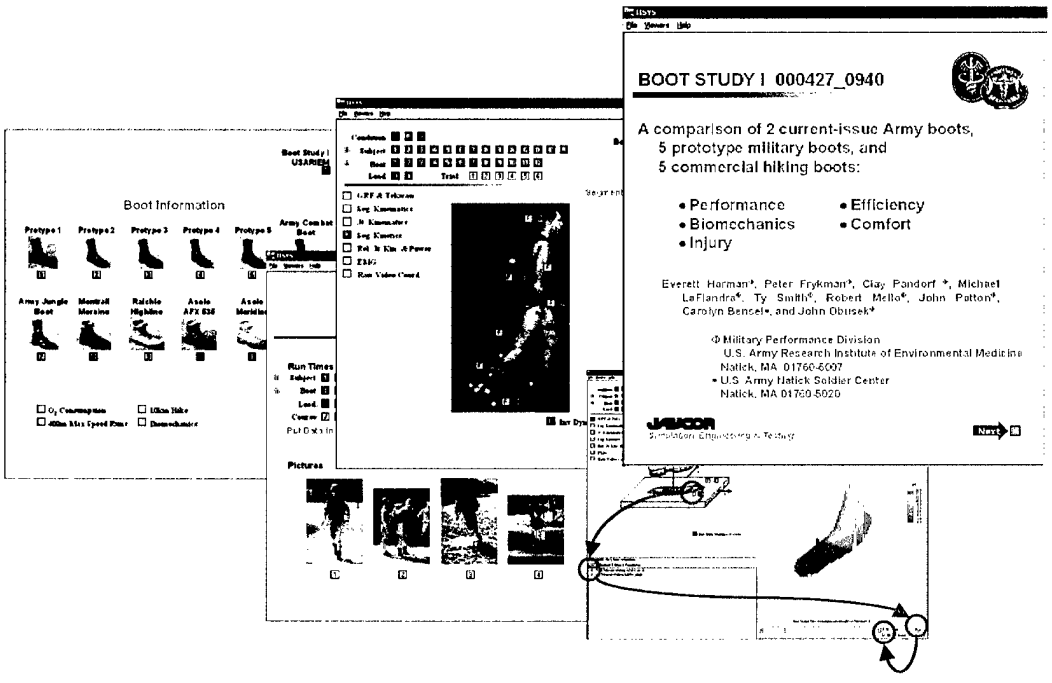

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Introduction

Because of the large incidence of blisters and other foot injuries associated with ill-fitting boots, the U.S. Army commissioned the Military Performance Division of the U.S. Army Research Institute of Environmental Medicine and the U.S. Army Natick Soldier Center to evaluate 12 boots for performance, efficiency, biomechanics, comfort, and injury. Fourteen subjects hiked, ran, walked, and jumped while various measures of boot performance were collected. This experiment generated over 10,000 files and requires more than 4.7 gigabytes of storage for the original data set. A description of the work and the conclusions drawn can be found in the report "A comparison of 2 current-issue Army boots, 5 prototype military boots, and 5 commercial hiking boots: performance, efficiency, biomechanics, comfort and injury."[1]

The objective of the Jaycor project is to provide an archival organizational scheme for the data that takes advantage of specialized software to easily select, view, analyze and present the information from Boot Study I.

ICON KEY

- ☑ Important information
- Technique tip
- Mouse navigation

The original data was received as a combination of files in ASCII, comma-delimited (.csv), and Excel (.xls) formats. The time-based data (e.g. rear foot angle versus time) was converted into **General Data Interchange Format (GDIF)**—a self-documented ASCII format (.jif) with variable name, units, and description included within the file. The GDIF ASCII format can be read by any text-based application, such as Excel or Notepad. The GDIF ASCII format was then converted into a binary form (.jib) that contains internal directories and pointers for rapid binary access. The GDIF binary format can be accessed by the programs in the Jaycor Data Access Toolkit. In addition, the original data contained computed variables and other nontime-based data

[1] Harman, E., P. Frykman, C. Pandorf, M. LaFiandra, T. Smith, R. Mello, J. Patton, C. Bensel, and J. Obusek. A comparison of 2 current-issue Army boots, 5 prototype military boots, and 5 commercial hiking boots: performance, efficiency, biomechanics, comfort and injury. Military Performance Division, U.S. Army Research Institute of Environmental Medicine. Report #000427-0940.

(e.g. average foot pressure). These quantities were placed in an MS Access database. Other than conversion of format, no modification of the original data was made.

The purpose of this User's Manual is to describe the organization of the data directory structure to allow the user to retrieve data directly from the files, as well as to provide instruction on how to access the data through the IISYS program. The User's Manual does not make conclusions, recommendations, and any other opinions on the methods or results of Boot Study I.

It is suggested that after setting up IISYS (either via the web or by installing to a local computer), users go through the Tutorial (Chapter 3) to become familiar with the data session. This tutorial will provide a starting point to "explore" the data using IISYS. Chapter 4 details each type of Boot Study I data and how to access it from within IISYS. In addition, Appendix A describes Surface Viewer, a program to view Tekscan insole pressure data in 3-dimensions.

Setting up an IISYS Session

There are currently two methods to start an IISYS session and gain access to the Boot Study I data: from the Jaycor server via the Web or by installing IISYS and the data on a local computer. Because of the large amount of disk space required to install the data for this study, the preferred method is to access the data via the Web. This has the added benefit of allowing researchers to access the data from any Windows-compatible PC connected to the Internet. In addition, there is a very limited dataset contained on a single CD (BootI Example) for small inquires and demonstration purposes.

The next section describes how to access IISYS and Boot Study I via the Web and from a local computer. How to install the Boot Study I data on a local computer is covered in Appendix B. For information on how to install IISYS on a local computer or how to use IISYS, please see the documentation supplied with the IISYS program.

For Web access, the Boot Study I IISYS session requires a PC-compatible computer with either a Web browser connected to the Internet. For a locally installed session, Windows 95/NT 4.0 (or higher) with Internet Explorer 4.0-5.01 and IISYS version 4.0 is required. A screen resolution of 800 × 600 or higher is recommended.

Starting IISYS Boot Study I from the Web

Please refer to *Supplemental Instructions: Starting IISYS Boot Study I from the Web.*

Starting IISYS Boot Study I from a Local Computer

1. After installing the Boot Study I data (Appendix B), start IISYS on a local computer.

2. From the IISYS *File* menu, choose *Open Session.*

3. Navigate through the folders, open the HotFiles folder in the Boot Study I folder and open the BootStudyI.ses session file.

Chapter

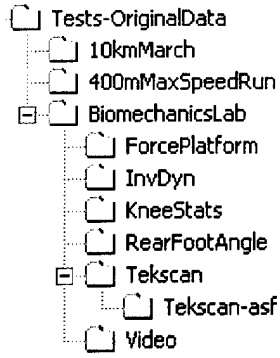
Directory Layout and File Naming Scheme

The magnitude and complexity of Boot Study I requires a precise storage and naming system in order to retrieve the data quickly and easily. This chapter explains the directory layout of the data and the file-naming scheme for researchers to locate the three types of data described in the Introduction. Note that understanding the contents of this chapter is not required for users who will be using IISYS exclusively since the program locates the proper data files automatically.

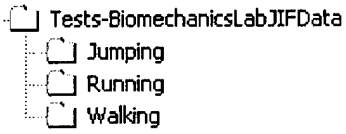
Directory Layout

Because of the large amount of disk space required to contain this project, the data was partitioned into directories depending file type. The original data (as submitted to Jaycor, Inc. for organization) was preserved in it's own folder system (Tests-OriginalData). In addition, biomechanic text-based GDIF (.jif) files were compressed and saved in it's own folder system (Tests-BiomechanicsLabJIFData). Binary GDIF (.jib) files were left uncompressed in a directory structure designed for access from an IISYS session (Tests). Within each folder system, the data was categorized based on the experiment or "test" (10 km March, 400 m Max Speed Run, Biomechanics, and O_2 Consumption). The folder layout for each data type can be found in the figures on the following page.

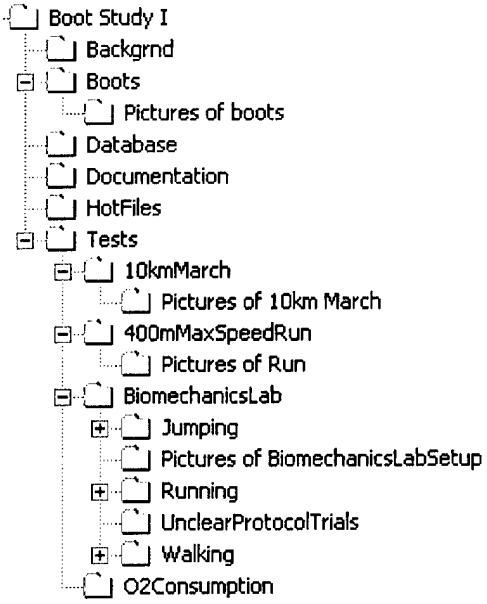
Original Data Folder Layout



.jif Data Folder Layout



.jib Data/IISYS Session Folder Layout



Biomechanic Data File-Naming Scheme

The large variety of experimental conditions required the use of a precise file-naming scheme, which was implemented by the researchers during data collection and preserved for this organization. To help further categorize the data into meaningful partitions, folders containing data from an individual experiment were created. In addition to Walking, Running, and Jumping, there were five other experimental parameters that dictated file (and folder) names: Side, Subject, Boot, Pack, and Trial Number. The naming convention can be found in the table below.

Name	Identifier	Value
Side	1st Letter	L,R-Tekscan Only
Subject	s	1-9, A, C-F
Boot	b	1-12
Pack	p	0, 1
Trial	t	1,2,3-walking, no pack
		A,B,C-walking, 60 lb. Pack
		F,G,H-running
		K,L,M-jumping

In addition, the file suffix indicates file type and is defined in the table below.

Suffix	Data Type
_ASF	Tekscan
_GRF	Computed biomechanic variables
_RFA	Rear foot angle
_TAD	Raw force platform data
_VID	Raw video coordinates

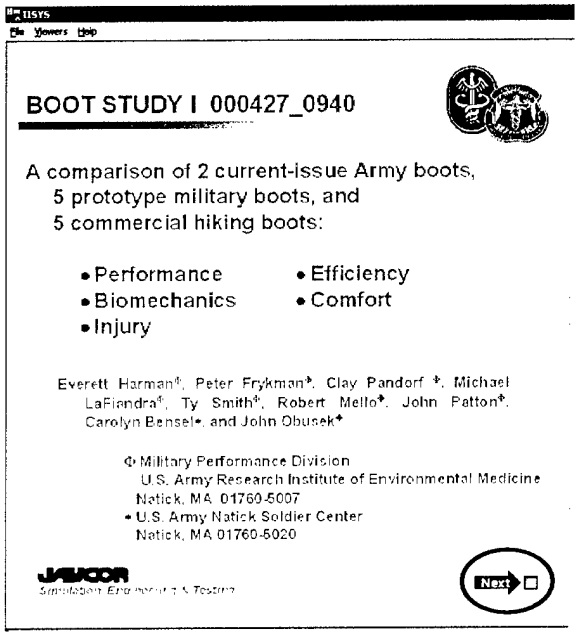
IISYS Session Tutorial

The purpose of this tutorial is to familiarize the user with some of the features of this IISYS session, most notably, the ability to view a set of experimental results from one out of ~3,000 experimental trials with only a few mouse clicks.

Beginning the Boot Study I Session

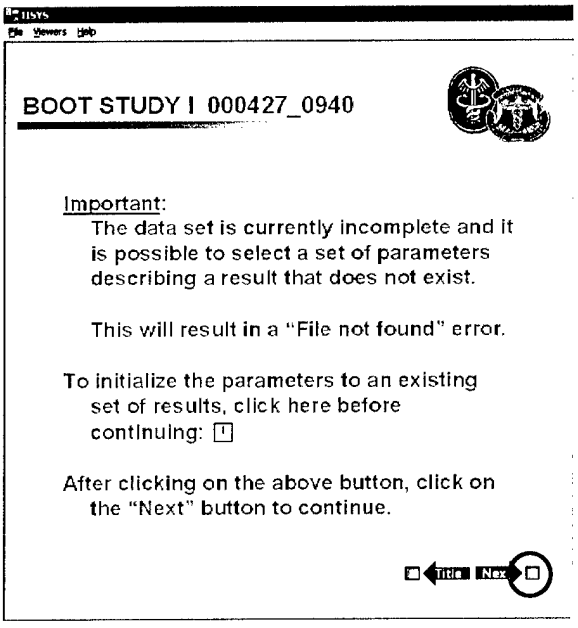
1. After starting IISYS Boot Study I session (page 2), a window similar to the one below appears. Note the three frames where information will be input and displayed: Context Document, Item List, and Data Viewer.

2. The **Title Page** for this project should be visible in the Context Document window.



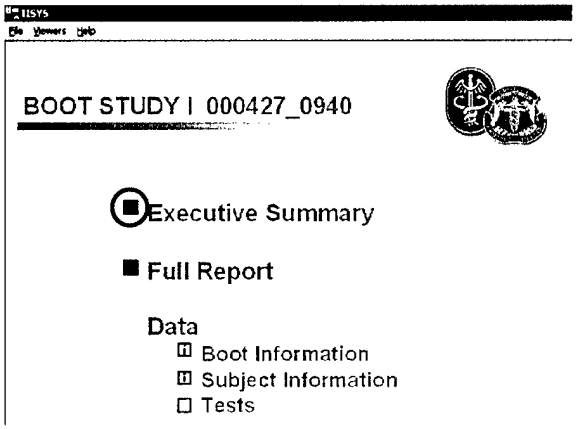
3. Click on the orange HotSpot in the lower right corner of the **Title Page** (*Next*).

4. The ensuing page notes the lack of some data in the Boot Study I session and suggests initializing some parameters to insure that a data set is presented during the session. Because this tutorial will access data that is known to exist, bypass the parameter initialization and click on the orange Hotspot in the lower corner (*Next*) to move to the **Home Page**.



Read the Executive Summary

1. Click on the blue HotSpot to the left of *Executive Summary* to view the document in Word. Exit Word and return to the IISYS session to continue the tutorial.

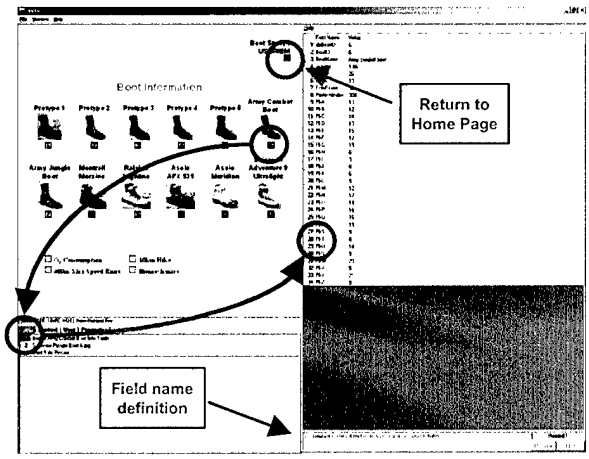


View the Boot Characteristics

1. From the **Home Page**, click on the light blue information HotSpot to the left of *Boot Information.*

2. Click on a blue numbered hotspot beneath a boot picture (e.g. *Boot 6*) to show the available information the Item List window.

3. To view the available database information (Name, Weight, Performance Index, etc.), click on the entry containing the green-labeled *Item 1.*



By moving the mouse pointer over a database field, the field name definition appears on the bottom of the screen.

4. Enlarged pictures of each boot are also available by clicking on the yellow-labeled *Item 2* and *Item 3*.

5. Return to the **Home Page** by clicking on the orange HotSpot in the upper right corner of the Context Document window. (This HotSpot is accessible from anywhere in the Boot Study IISYS session.)

Generate a Ground Reaction Force X/Y Graph

1. Ground reaction forces and Tekscan foot pressure data are part of the Biomechanic Tests group and can be accessed from the **Home Page** by clicking on the pink HotSpot next to *Tests*, followed by the HotSpot next to *Biomechanics*, and, finally, the HotSpot next to *GRF & Tekscan*.

Tests ⇒ Biomechanics ⇒ GRF & Tekscan

2. The ensuing **GRF & Tekscan** Context Document window contains multiple HotSpots to allow the selection of a specific trial quickly and easily. For this tutorial, we will access the data for *Walking-Subject 2-Boot 5-No Pack-Trial 1*.

3. For "Walking," select the green HotSpot labeled "W" on the *Condition* line. Note that the *Parameter* list in the Item List Window has been updated with your selection.

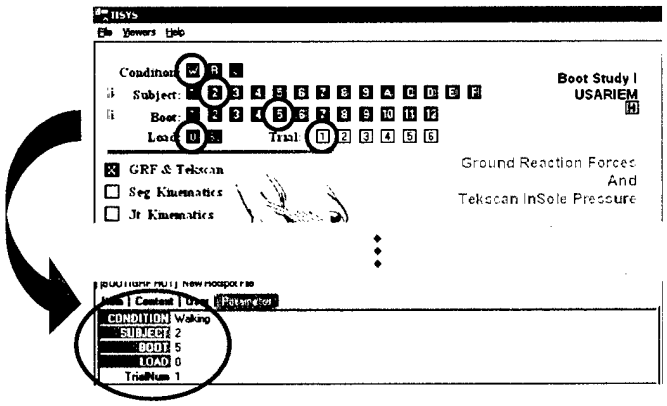
4. Continue by specifying "Subject 2." Select the blue HotSpot labeled "2" on the *Subject* line.

5. For "Boot 5," select the blue HotSpot labeled "5" on the *Boot* line.

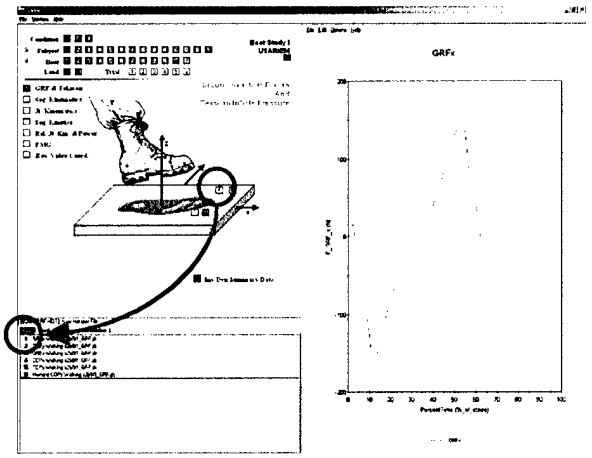
6. For "No Pack," select the brown HotSpot labeled "0" on the *Load* line.

7. For "Trial 1," select the yellow HotSpot labeled "1" on the *Trial* line.

8. At this point, the *Parameter* list in the **Item List** window should contain five items that uniquely specify the trial to be accessed, as shown below.



9. To specify ground reaction force data, click on the orange HotSpot in the upper right corner of the force platform picture (labeled "F"). This will update the **Item List** window to contain the ground reaction force and center of pressure components.

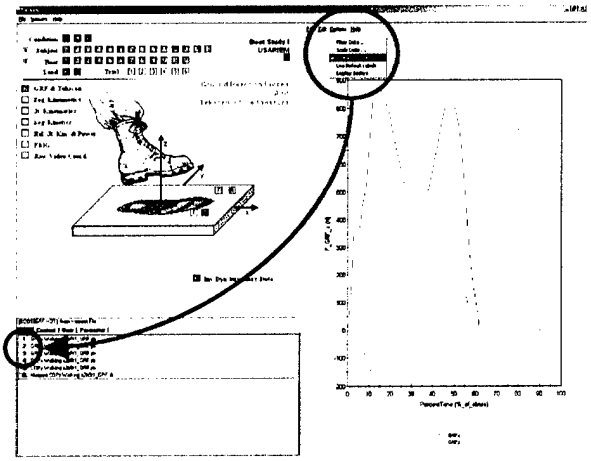


10. As shown on the right side of the above figure, have the data automatically graphed using the X/Y Plot Viewer by clicking on an entry in the *Item* section.

Overlay Additional Curves and Copy Data to the Clipboard

1. To add a second time-based plot to the graph, from the X/Y Plot Viewer *Options* menu, choose *Overlay Curves.*

2. Click on another entry in the *Item* section to add the data to the viewer.



3. To output the data from the multiple plots graphed in the viewer, choose *Copy* from the *Edit* menu of the X/Y Plot Viewer.

4. Start Excel (or any other text-based application) and choose *Edit...Paste.* Note that time, the variable names, and units are also pasted into the program. Exit Excel and return to IISYS to continue the tutorial.

Microsoft Excel

File Edit View Insert Format Tools Data Window Help

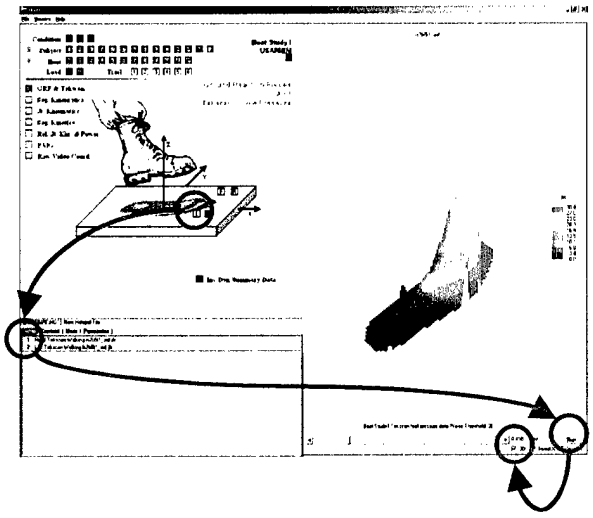
G8

Book1

	A	B	C	D	E
1	PercentTime	F_GRF_x	PercentTime	F_GRF_z	
2	%_of_stride	N	%_of_stride	N	
3	0	0	0	0	
4	1	4.996	1	79.331	
5	2	18.789	2	242.997	
6	3	4.743	3	356.662	
7	4	-29.855	4	353.054	

Generate a Tekscan 3D Surface Graph

1. To view the Tekscan foot pressure data, click on the yellow HotSpot labeled "T" in the Context Document window and select a yellow entry in *Item* section.



2. Start the Tekscan animation by clicking on the *Run* button in the lower right corner of the Surface Viewer window.

3. Change the view from 3D to 2D by unchecking the check box.

Exit the Boot Study I Session

1. This concludes the tutorial. To quit IISYS and end the Boot Study session, choose *Exit* from the IISYS *File* menu.

Boot Study I IISYS Session Contents

This IISYS session contains both the data and reports pertaining to Boot Study I (#000427_0940). The Boot Study I dataset was divided into four experimental datasets: 10 km Hike, 400 m Max Speed Runs, O_2 Consumption, and Biomechanics. In addition, information and pictures of the boots, tests, and subjects can be accessed from this session. The table on the following page summarizes which IISYS Context page each data set is located. After providing the step-by-step process to start the Boot Study I IISYS session, this chapter describes each of the different types of data and how they can be accessed.

Note that because of the size of this study, significant portions of data were not available at publication time and will be added to the project as it becomes available. This includes O_2 Consumption, 10km Hike, and most of the biomechanics analysis of running and jumping. The most complete data set is the biomechanic analysis of walking. Attempting to access missing data will result in a "File not found" error.

☑ **Attempting to access missing data will result in a "File not found" error.**

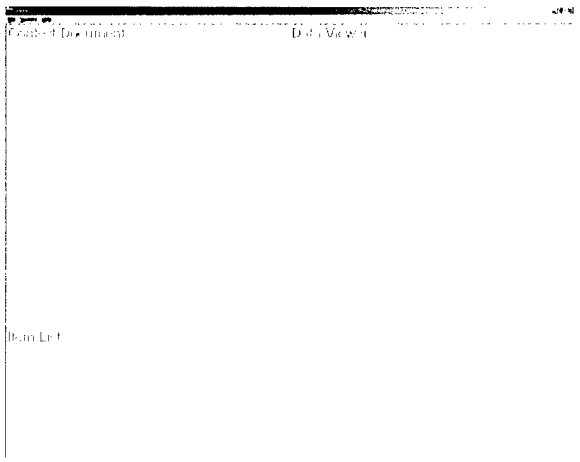
The Context Document window will contain the title of the current experimental dataset and/or subset in blue text.

IISYS Context Page Summary Table

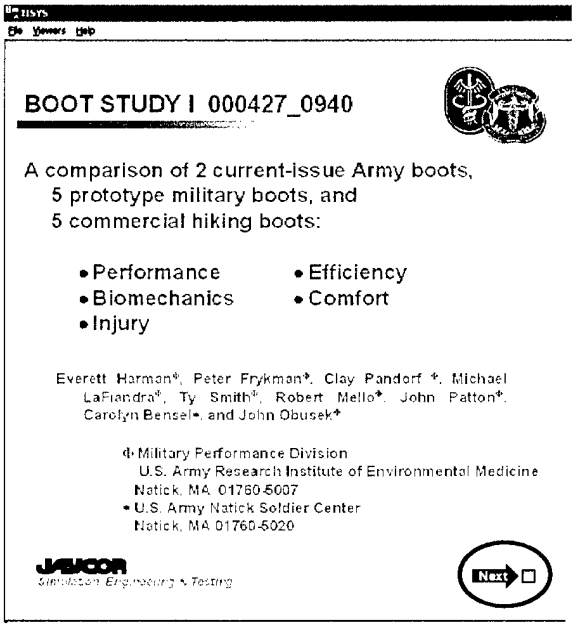
Variables	IISYS Context Page: 400 m Max Speed Run	Bio-mechanics	GRF & Tekscan	Seg. Kinematics	Jt. Kinematics	Seg. Kinetics	Rel. Jt. Kin. & Power	EMG	Raw Video Coord.	Boot Information	Subject Information
400 m Max Speed Run											
Time	✔										
Pictures	✔										
Biomechanics											
Summary Data											
Inverse dynamics		✔	✔	✔	✔	✔	✔	✔	✔		
Foot pressure			✔								
Knee joint angle					✔						
Rear foot angle				✔							
Kinematics											
Segment											
Linear				✔							
Angular				✔							
Joint											
Linear					✔						
Angular					✔						
Relative joint angle							✔				
Rear foot angle				✔							
Kinetics											
Ground reaction forces			✔								
Center of pressure			✔								
Segment											
Joint reaction forces						✔					
Moments						✔					
Joint power							✔				
Other											
EMG								✔			
Raw data											
Force platform data			✔								
Video coordinates									✔		
Tekscan data			✔								
Boot Information											
Characteristics										✔	
Performance Score										✔	
Pictures										✔	
Subject Information											
Characteristics											✔

Starting the Boot Study I Session

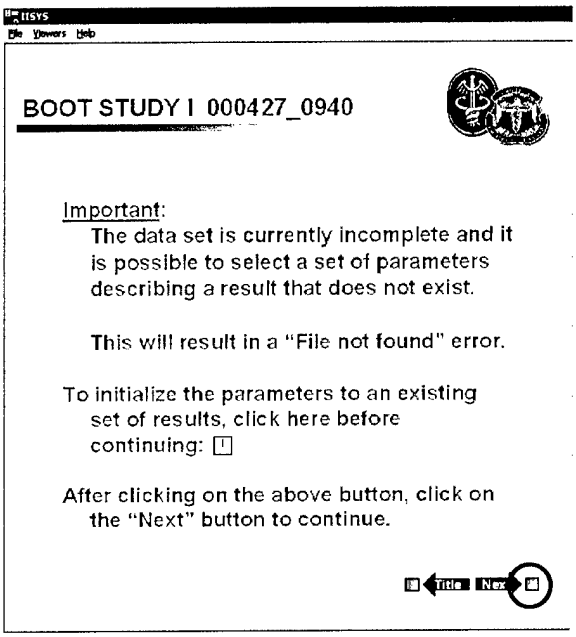
1. After starting IISYS Boot Study I session (page 2), a window similar to the one below appears. Note the three frames where information will be input and displayed: Context Document, Item List, and Data Viewer.



2. Initially, the following **Title Page** appears in the Context Document window. To continue to the next page, click on the orange HotSpot in the lower right corner (*Next*).

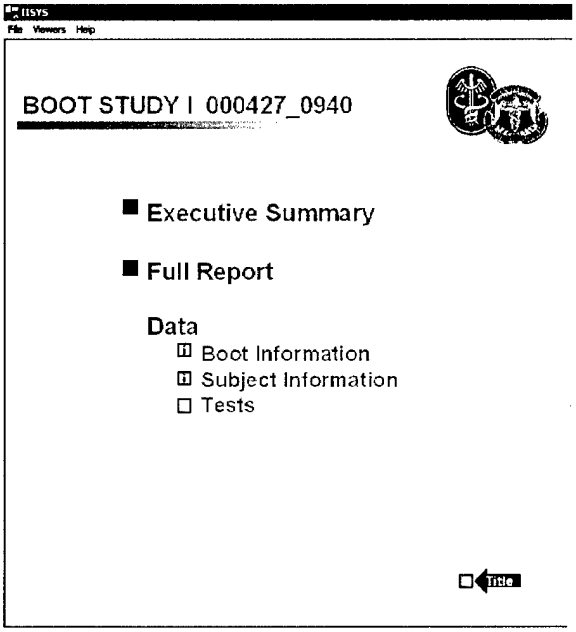


3. The ensuing page notes the lack of some data in the Boot Study I session and suggests initializing some parameters to insure that a data set is presented during the session. Although not required, it is recommended that user's click on the yellow hotspot to initialize the parameters and continue by clicking on the orange Hotspot in the lower corner (*Next*) to move to the **Home Page.**



Home Page

The **Home Page** is the starting point for the IISYS session and all the information for Boot Study I can be accessed from this page.



Boot Study I
USARIEM

If you become "lost" in the IISYS session, you can always return to the Home Page by clicking on the Orange HotSpot in the left-hand corner of all other session pages.

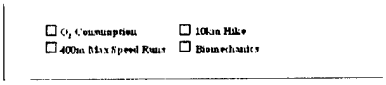
The *Executive Summary* and *Full Report* are accessed from the **Home Page**. Clicking on a HotSpot will automatically launch Microsoft Word and open the appropriate file (..\DOCUMENTATION\BOOT, PHASE I, 12 BOOTS TECH REPORT, NUMBERED REFS.DOC and ..\DOCUMENTATION\EXECUTIVE SUMMARY.DOC). In addition, an electronic version of the User's Manual can be found in the documentation directory (..\DOCUMENTATION\BOOT STUDY I USER'S MANUAL.DOC).

Clicking on the *Tests* HotSpot brings up the **Tests Page** (page 24), which is the starting point to the largest part of the IISYS session: the experimental datasets and results. Notes on **Boot Information** and **Subject Information** can be found starting on page 22. Note also that clicking on the orange HotSpot in the lower right corner brings you back to the **Title Page**.

Boots & Subject Information Pages

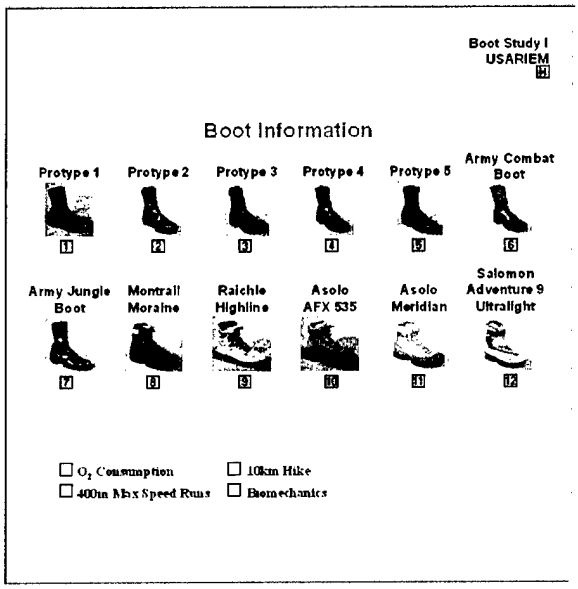
In addition to a few pictures, the "information" pages provide links to a database containing the descriptive data collected on each boot and subject. In addition, **Boot Information** contains the rankings and performance indices used to make the recommendations and conclusions described in the *Full Report*.

Both the Boot Information and Subject Information pages can be access from almost anywhere within the IISYS session by clicking on the light blue HotSpots containing the letter "i."



The lower half of both the Boot Information and Subject Information pages contain Hotspots to the four major test groups in this study. This allows you to return to a test group without having to return to the Home Page first.

Boot Information



Accessible Data from This Page

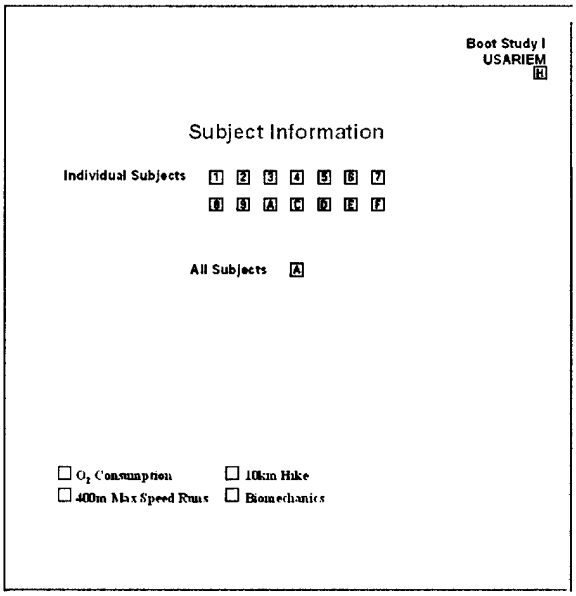
Database Viewer

Boot ID, Name, Weight, Height, Rank, Final score, Performance index, Variable scores

Picture Viewer

Front, Side

Subject Information



Accessible Data from This Page

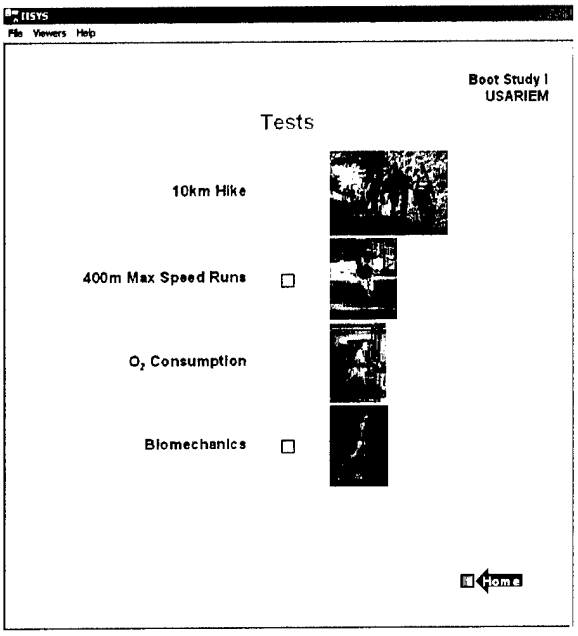
Database Viewer

Subject ID, Age, Weight, Height, Activity Score, Rank, MOS

Tests Page

Home ⇒Tests

The **Test Page** contains the links to the four major experimental datasets: 10 km Hike, 400m Max Speed Runs, O_2 Consumption, and Biomechanics. (As of the publication time, only 400m Max Speed Runs and Biomechanics were available.) Clicking on a pink HotSpot will link to the appropriate Context Document.

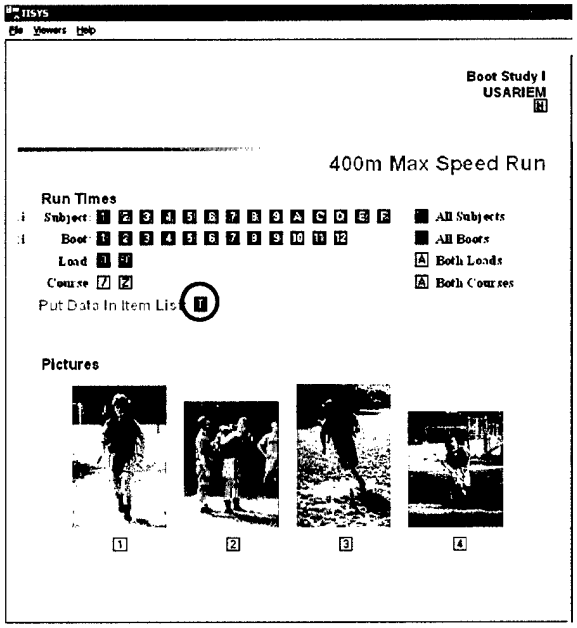


10 km Hike

Data for this experiment was not available at publication time.

400 m Max Speed Run

Home ⇒Tests ⇒ 400m Max Speed Runs



Accessible Data from This Page

Database Viewer
Run time

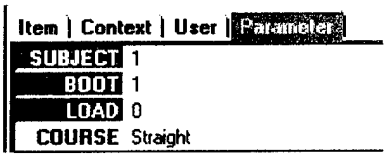
Picture Viewer
Experimental testing procedures

Run Times

1. To access the 400m maximum speed run times for an individual or group, select the appropriate HotSpots:

   Subject (or All Subjects)
   Boot (or All Boots)
   Load (or Both Loads)
   Course (or Both Courses)

2. The *Parameter* list will contain the four items that uniquely specify the trial(s) to be accessed, an example is shown below.



☑ **Load the trial(s) into the Item List by clicking on the green HotSpot labeled "T" as shown by the red circle in the figure on page 20.**

3. Access the database by clicking on *Item 1* in the *Item* section and viewing the data in the viewer. For a group of trials, click on *Next* in the lower right corner of the Database Viewer to view the next run time.

Pictures

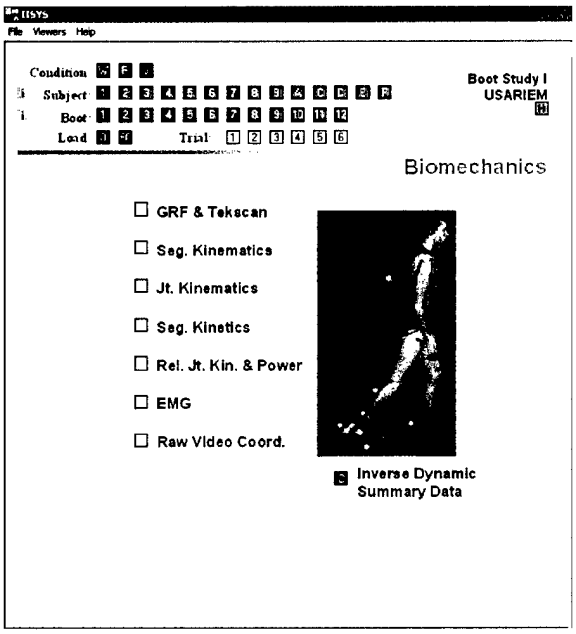
To view an enlarged view of the pictures shown in the **400m Max Speed Run** Context Document window, click on the appropriate yellow HotSpots below the pictures.

O_2 Consumption

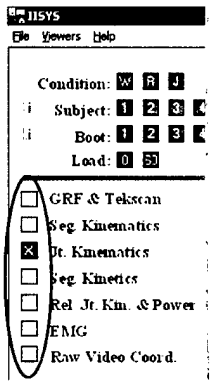
Data for this experiment was not available at publication time.

Biomechanics

Home ⇒Tests ⇒ Biomechanics



Eight different subsets of data are available from within the Biomechanics experimental dataset and can be accessed by clicking on the appropriate pink or green HotSpots. A brief description of each subset is available in the following pages. Note that the upper portion of the Context Document window contains the HotSpots to set the *Parameters* (Condition, Subject, Boot, Load, and Trial) for the Biomechanics dataset. These settings can be set now or within any of the subset windows. The *Parameter* settings are saved between Biomechanic subsets.



It is easy to switch between Biomechanic subsets. Once a subset has been displayed, other subsets can be accessed by clicking on the appropriate pink HotSpot on the left side of the current page. In addition, the current subset's HotSpot is highlighted in red.

Inverse Dynamic Summary Data

Accessible Data from This Page

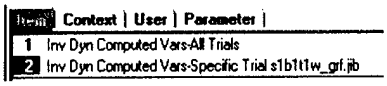
Database Viewer

Inverse dynamic file name, 200 variable names

The **Inverse Dynamic Summary Data** contains 200 variables that have been calculated from the various biomechanic values. This data is accessible from any **Biomechanic** page by clicking on the green HotSpot labeled "C."

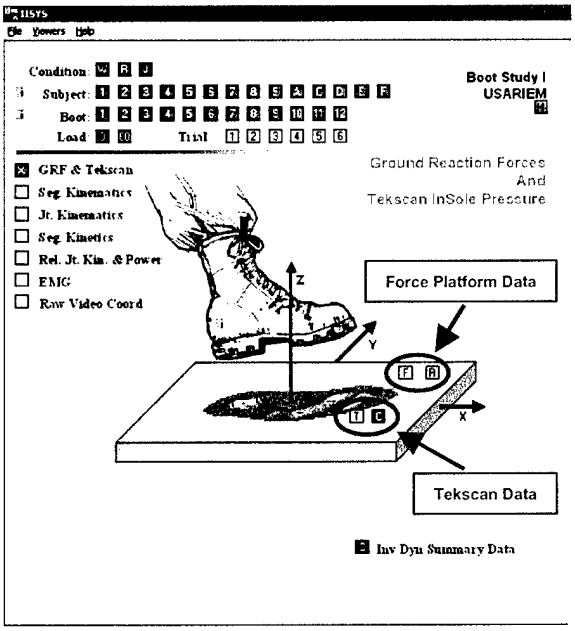
In the **Item List** window, All Trials (light green) or an individual trial (dark green) as specified by the *Parameters* can be selected for viewing in the Database Viewer.

By moving the mouse pointer over a database field, the field name definition appears on the bottom of the screen.



Ground Reaction Forces and Tekscan InSole Pressure

Home ⇒Tests ⇒ Biomechanics ⇒ GRF & Tekscan



This Context Document accesses force platform ground reaction force data as well as Tekscan insole foot pressure measurements. Both the raw and processed data are available for viewing and export.

Instructions on how to use the Surface Viewer can be found on page 35.

Ground Reaction Forces

Accessible Data from This Page

X/Y Plot Viewer

Ground reaction forces, Center of pressure coordinates, Moments
Force platform raw signals

Tekscan InSole Pressure

Accessible Data from This Page

Surface Viewer

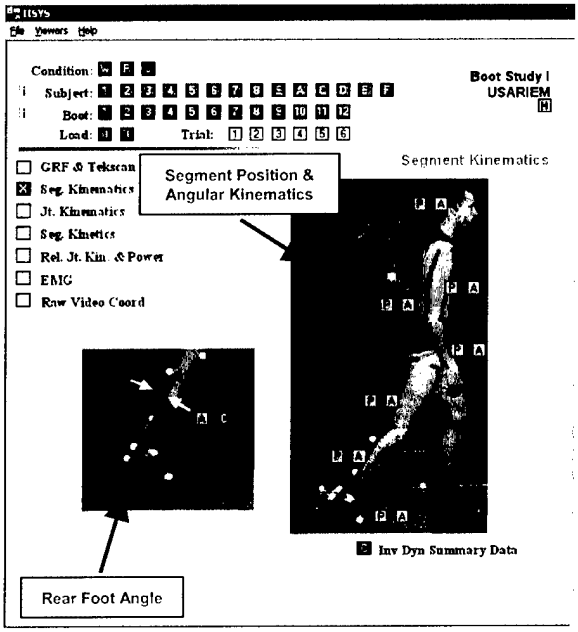
Raw Tekscan pressure data

Database Viewer

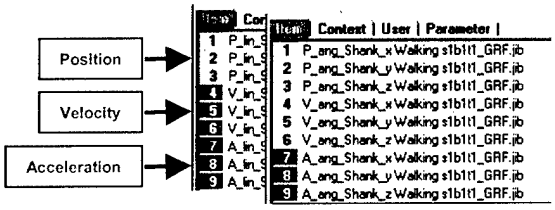
File name, 80 variable values

Segment Kinematics

Home ⇒Tests ⇒ Biomechanics ⇒ Seg. Kinematics



Kinematics (position, velocity, and acceleration) for the segments as well as the rear foot angle are accessible from this page. The linear and angular data for the foot, shank, thigh, trunk, upper arm, forearm, and head/neck segments are linked to the blue and green HotSpots. Color variations in the *Item* section of the **Item List** (as well as P, V, A in the label) indicate level of differentiation and items are plotted with the X/Y Viewer when selected.



Rear foot angle data follows the same color variations as the segment kinematics (angle kinematics only). In addition, the dark green HotSpot labeled "C" in the rear foot angle picture links the *Item* section of the **Item List** to display the computed rear foot angle variables (such as maximum and average angle) from the Database Viewer.

Accessible Data from This Page

X/Y Plot Viewer

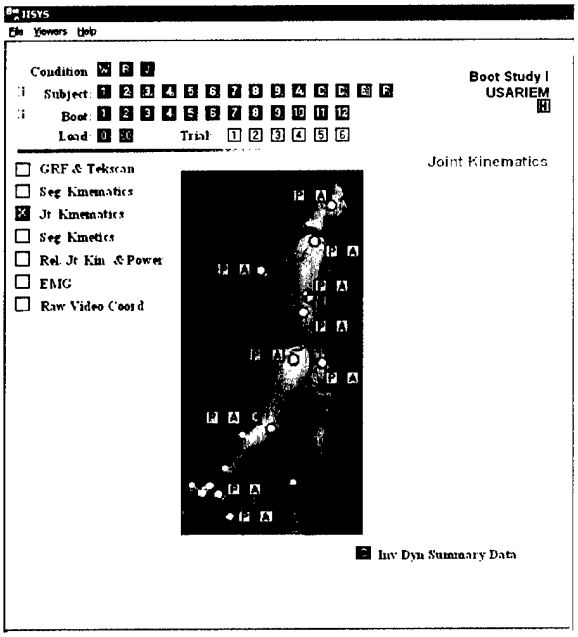
Segment linear and angular kinematics
Rear foot angle kinematics

Database Viewer

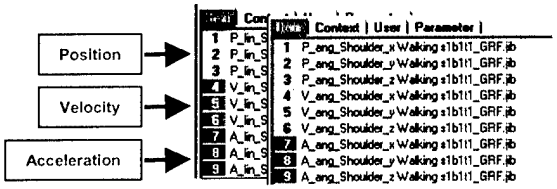
File name, 5 rear foot angle variable values

Joint Kinematics

Home ⇒Tests ⇒ Biomechanics ⇒ Jt. Kinematics



Kinematics (position, velocity, and acceleration) for the joint centers as well as the total body center of mass are accessible from this page. The linear and angular data for the 5th metatarsal, ankle, knee, hip, shoulder, elbow, wrist, head, pack, and center of mass segments are linked to the blue and green HotSpots. Color variations in the *Item* section of the **Item List** (as well as P, V, A in the label) indicate level of differentiation and items are plotted with the X/Y Viewer when selected.



In addition, the dark green HotSpot labeled "C" near the knee joint links the *Item* section of the **Item List** to display the computed knee variables (such as maximum and average angle) in the Database Viewer.

Accessible Data from This Page

X/Y Plot Viewer

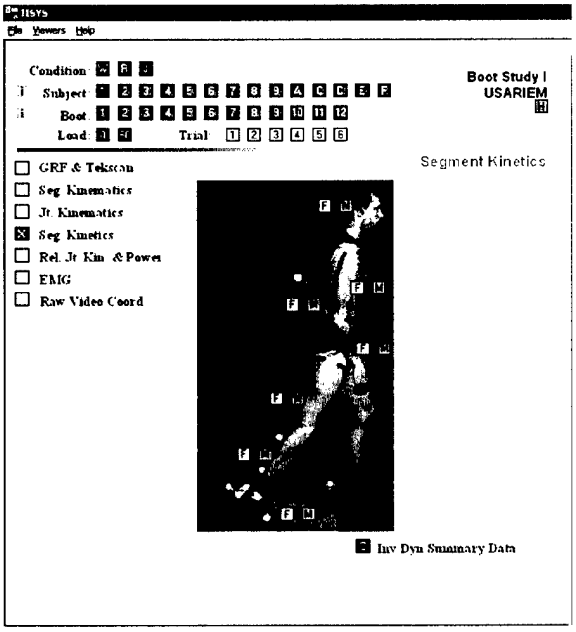
Joint linear and angular kinematics

Database Viewer

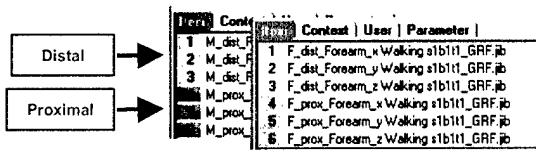
File name, 5 knee joint angle variable values

Segment Kinetics

Home ⇒Tests ⇒ Biomechanics ⇒ Seg. Kinetics



Kinetics (forces and moments) for the proximal and distal ends of each segment is accessible from this page. The three forces and moments components (laboratory reference frame X-dir, Y-dir, and Z-dir) for the foot, shank, thigh, trunk, upper arm, forearm, head/neck segments are linked to the violet and orange HotSpots. Color variations in the *Item* section of the **Item List** (as well as *dist* and *prox* in the label) indicate distal and proximal kinetics. Items are plotted with the X/Y Viewer when selected.



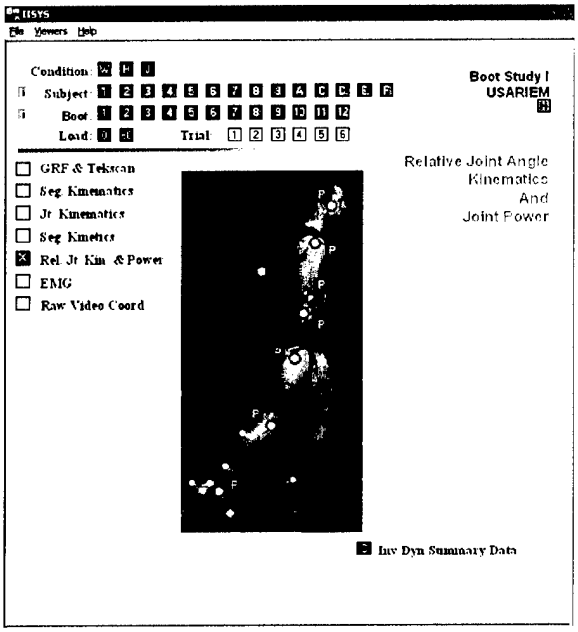
Accessible Data from This Page

X/Y Plot Viewer

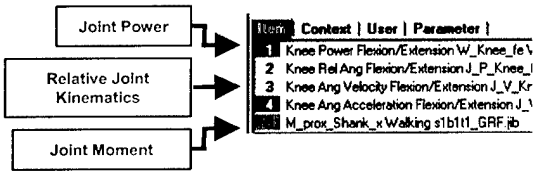
Segment distal and proximal kinetics

Relative Joint Angle Kinematics and Joint Power

Home ⇒Tests ⇒ Biomechanics ⇒ Rel. Jt. Kin. & Power



Relative joint angular kinematics (angle, angular velocity, and angular acceleration) as well as joint power, which is the product of relative joint angular velocity and joint moment, are accessible from this Context Document window. In addition, joint moment (repeated from the **Kinetics Page**) is listed in the **Item List** due to its involvement in the calculation of joint power. Joint power data is available for the ankle, knee, hip, shoulder, elbow, head, and total body center of mass. Total body center of mass power is given as three components (Laboratory X-dir, Y-dir, and Z-dir) as well as a resultant power.



Note that the hip and shoulder **Item Lists** contain joint power and relative angle entries for two directions: flexion/extension and abduction/adduction.

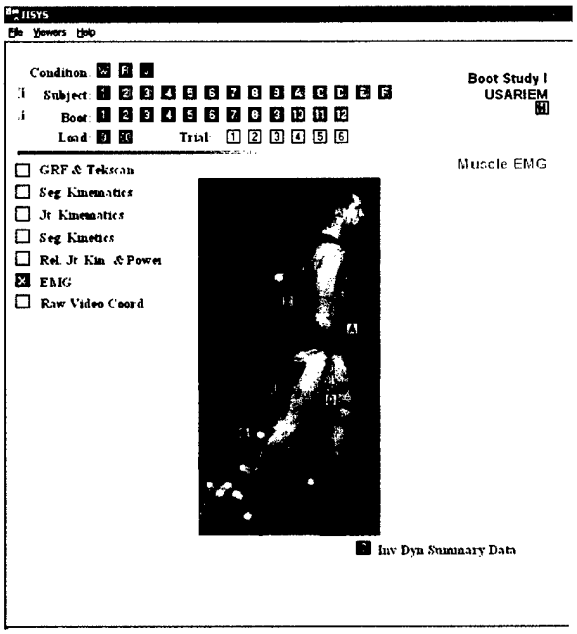
Accessible Data from This Page

X/Y Plot Viewer

Joint power, relative joint angle kinematics, joint moments

Muscle EMG

Home ⇒Tests ⇒ Biomechanics ⇒ Muscle EMG



Electromyography signals were collected on five muscles during the biomechanics portion of this study (the gastrocnemius, hamstring, erector spinae, rectus abdominis, and quadriceps). Root mean square (RMS) values as a percent of gait cycle are available by clicking on light blue hotspot followed by *Item 1* in the **Item List**.

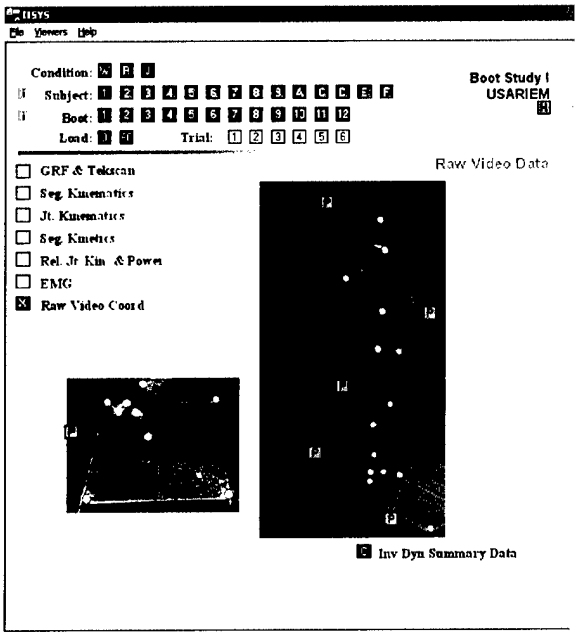
Accessible Data from This Page

X/Y Plot Viewer

5 electromyography signals

Raw Video Coordinates

Home ⇒Tests ⇒ Biomechanics ⇒ Raw Video Coordinates



The 3D coordinates of 17 markers that were used in the biomechanic portion of this study are accessible from this Context Document. The markers are grouped as follows: force platform corners, pack/head, arm, upper leg, rear foot angle, and foot. Clicking on the light blue HotSpots adds the appropriate group to the **Item List**.

Accessible Data from This Page

X/Y Plot Viewer

17 3D videography marker coordinates

Surface Viewer 1.0

Surface Viewer 1.0 displays two-dimensional time-based data as either a 3D surface or 2D contour plot. It is a stand-alone application capable of running within a "container" application such as a web browser or ViewDoc. It also automatically launches from within an IISYS session if needed. Both Surface Viewer and ViewDoc are installed automatically with the standard IISYS installation.

Selected portions of a .jif file formatted for Surface Viewer is shown below. Note that although the data is a three-dimensional array (with time as the first dimension), it is saved as a large single-dimension array (ZDirData). The values of iPage, iXDir, and iYDir allow Surface Viewer to reconstruct the 3D array before plotting.

.jif file formatted for Surface Viewer

```
float( ZDirData[] );
int( iPage );
int( iXDir );
int( iYDir );
float( HoleValue );
float ( Spacing[] );
float( Time[] );

data(iPage)  151;
data(iXDir)  60;
data(iYDir)  21;
data(HoleValue) -9;
data(Spacing) 0.2 0.2;

units(ZDirData, "psi");
units(iPage, "sec");
units(iXDir, "in");
units(iYDir, "in");
units(Spacing, "in");

label(ZDirData, "Boot Study I Tekscan foot pressure data
(Noise Threshold  3)");
label(iPage, "Total number of frames");
label(iXDir, "Total number of sensors in Medial Lateral
Direction");
label(iYDir, "Total number of sensors in Anterior Posterior
Direction");
label(HoleValue, "Treat this value as a missing value");
label(Spacing, "X and Y distance between sensors");
```

```
data(ZDirData)
-9 -9 -9 -9 0 0 0 0 0 0 0 0 6.2 8.26 8.26 0 0 0 0 -9 -9
 -9 -9 -9 0 0 0 0 0 6.2 6.2 6.2 10.3 16.5 20.7 18.6 12.4
6.2 0 0 0 -9
   ⋮
-9 -9 -9 -9 0 0 0 4.13 6.2 8.26 8.26 8.26 4.13 4.13 0 0 0 -
9 -9 -9 -9
 -9 -9 -9 -9 -9 0 0 0 0 0 0 0 0 0 0 0 0 -9 -9 -9 -9
;

data(Time)
       0
 0.01667
 0.03334
   ⋮
 2.48383
  2.5005
;
```

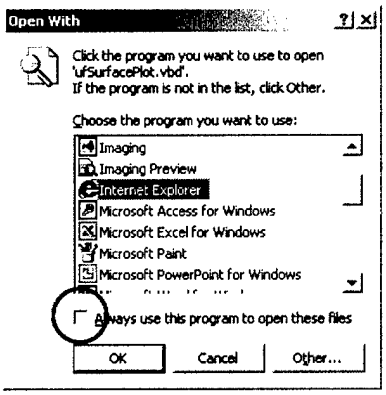
Starting Surface Viewer from a Web Browser

This is not the preferred method to launch Surface Viewer because it is possible to change the .vbd file association to the web browser. (If this happens, see page 40.) The preferred method is to use ViewDoc to run Surface Viewer.

1. Locate and double click ufSurfacePlot.vbd, usually in the ..\Program Files\Jaycor\IISYS\Viewers\SurfaceViewer folder.

2. In the **Open With** dialogue box, select a web browser such as Internet Explorer.

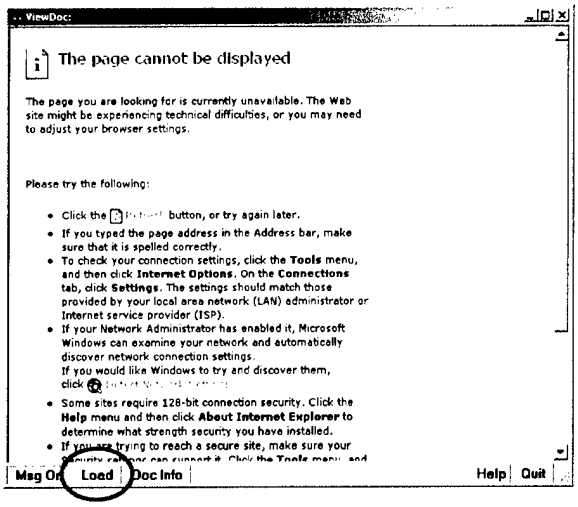
To maintain compatibility with IISYS, make sure *Always use this program to open these files* is unchecked. See page 40 if a file association problem develops with IISYS.



Starting Surface Viewer from ViewDoc

1. Locate and double click ViewDoc.exe, usually in the ..\Program Files\Jaycor\Utility folder.

2. Click on the button labeled *Load.*

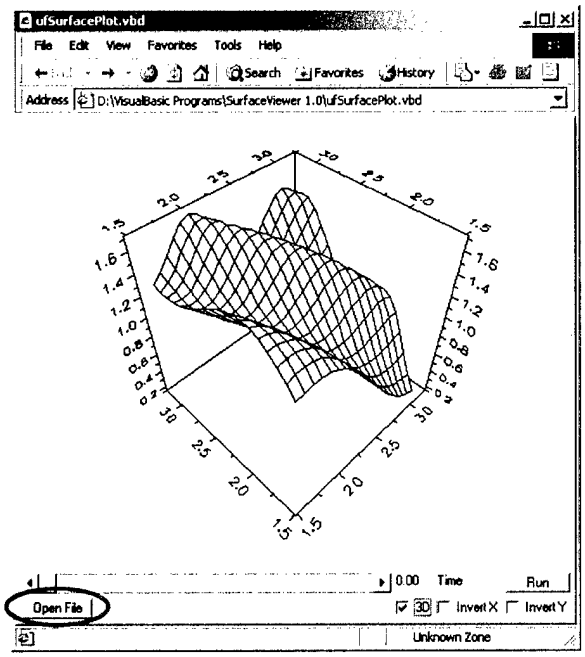


3. Using the browsing window, locate and open ufSurfacePlot.vbd, usually in the ..\Program Files\Jaycor\IISYS\Viewers\SurfaceViewer folder.

You may want to create a shortcut to Surface Viewer on the desktop by creating a shortcut for ViewDoc.exe and modifying the *Target Property* of the shortcut to include SurfaceViewer (i.e.
"C:\Program Files\Jaycor\Utility\ViewDoc.exe" SurfaceViewer**).**

Opening and Viewing a File in Surface Viewer

1. After starting Surface Viewer, click on *Open File* in the lower left corner of the window.



2. Using the Open File dialogue box, select the GDIF file to be viewed.

3. After the file loads, click on *Run* in the lower right corner of the window.

Surface Viewer Options

Scroll Bar

To view a specific time frame, click and hold the scroll bar slider. Drag the slider to the desired time frame. In addition, the arrows on the end of the scroll bar can be used to increment the plot through a single time step.

3D

This checkbox switches the view from 3D (default) to a 2D contour plot.

InvertX and InvertY

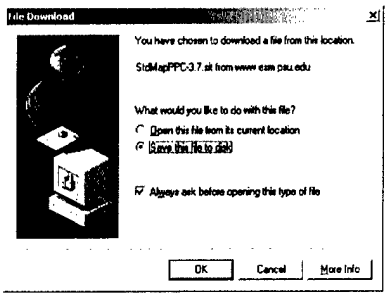
These checkboxes change the view (in both 3D and 2D mode) by flipping either the X or Y axes.

Free Rotation

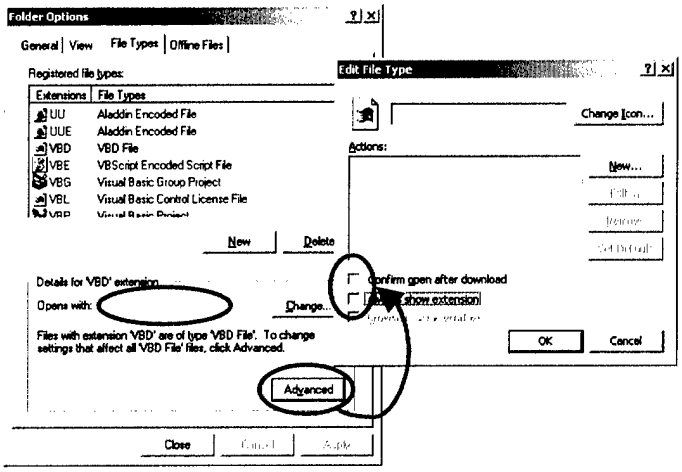
Click and hold both the left and right mouse button simultaneously while the cursor is in the plotting area to allow the 3D plot to be freely rotated to any viewing angle.

Updating the File Association

If the following dialogue appears when starting SurfaceViewer or IISYS, Windows has inadvertently updated your file associations incorrectly.



To remove the file association, update the "VBD" *File Type*, making sure that the settings are identical to the figure shown below. (Note: you may have to delete the "VBD" setting and create a new one to incorporate all the settings.)



Installing Boot Study I on a Local Computer

There are three copies of the data and any one of these copies can be installed on a hard drive. The approximate size of each installation is shown below.

	CD Disk #	Size *Compressed*	Size *Uncompressed*
IISYS Session (.jib data)	1 - 6	---	3.4 GB
.jif data	7	0.4 GB	3.4 GB
Original data	8	0.4 GB	4.7 GB

Binary Data Installation

To install the binary session from CD #1-6, copy the data on the CD's to a hard drive, making sure to place the contents of CD #2-6 in the appropriate folders that were created by copying CD #1. The proper directory layout is shown in the **.jib Data/IISYS Session Folder Layout** diagram on page 6.

The step-by-step instructions are as follows:

1. Create a main folder to contain the session (e.g. D:\Boot Study I).
2. Copy all the folders in CD #1 to the main folder.
3. From CD #2, copy all the folders in BootICD_2\Tests\BiomechanicsLab\Walking into ..\Tests\BiomechanicsLab\Walking.
4. From CD #3, copy all the folders in BootICD_3\Tests\BiomechanicsLab\Walking into ..\Tests\BiomechanicsLab\Walking.
5. From CD #4, copy all the folders in BootICD_4\Tests\BiomechanicsLab\Jumping into ..\Tests\BiomechanicsLab\Jumping.
6. From CD #5, copy all the folders in BootICD_5\Tests\BiomechanicsLab\Jumping into ..\Tests\BiomechanicsLab\Jumping

and all the folders in BootICD_5\Tests\BiomechanicsLab\Running into ..\Tests\BiomechanicsLab\Running.

7. From CD #6, copy all the folders in BootICD_6\Tests\BiomechanicsLab\Running into ..\Tests\BiomechanicsLab\Running.

ASCII Data Installation

To install the compressed .jif version of the data, copy the folder Tests-BiomechanicsLabJIFData on CD #7 to the hard drive, preferably into the main folder used to install the IISYS Session since the data organization is identical.

Original Data Installation

To install the compressed version of the original data (as submitted to Jaycor, Inc. for organization), copy the folder Tests-OriginalData on CD #8 to the hard drive. This data is not organized in the same manner as the binary or ASCII files but can be placed in the main folder used to install the binary session.

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