

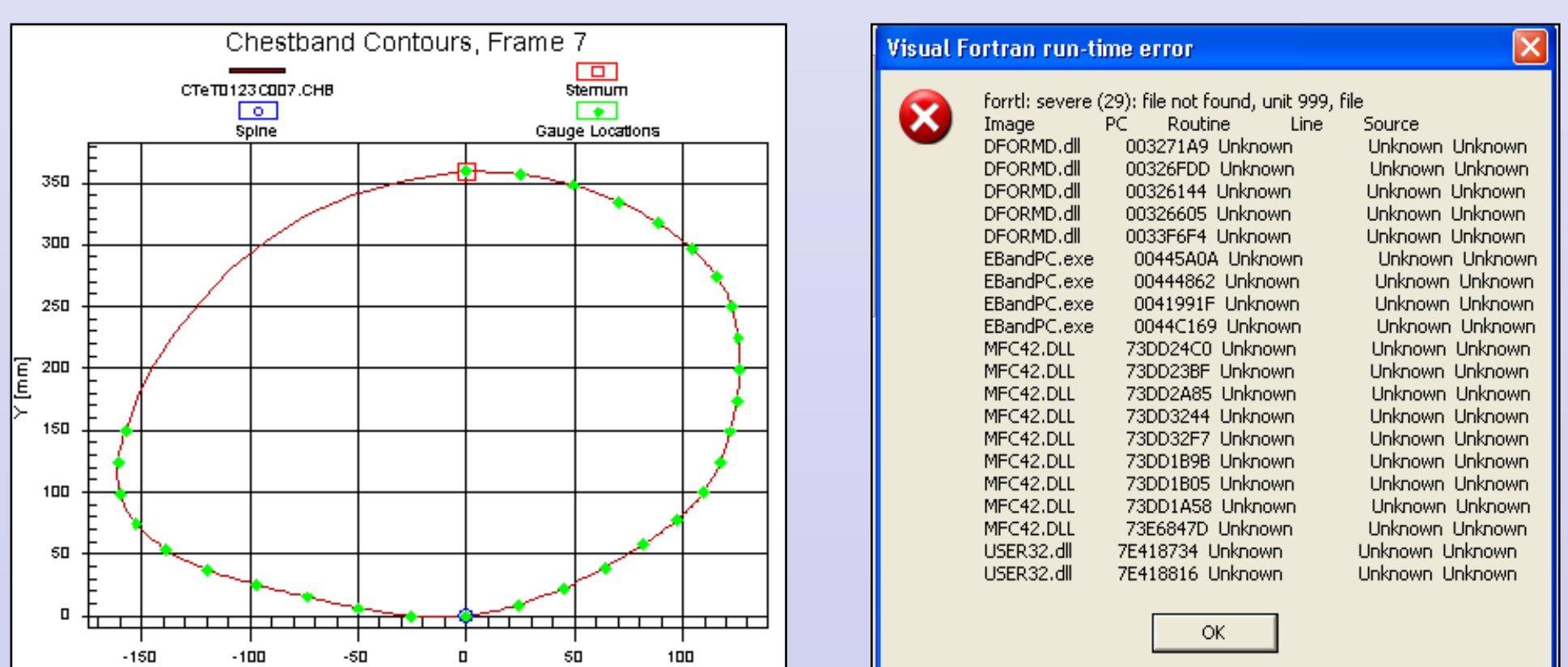
Chestband Description



- View of a typical chestband setup
- Used to measure the deformation of a thorax during a collision
- Composed of 40-80 strain gages
- Measures curvature in rad/mm

RBandPC

Current chestband analysis program used at TRC



Left: Example of output from RBandPC
Right: Sample RBandPC error message

RBandPC Limitations:

- Poor user-friendliness
- Poor reliability
- Difficult navigation
- Poor functionality
- Unrealistic representation

Project Goals

- Create new program in MATLAB:
 - Compatible with current data acquisition system
 - Capable of translation and curvature analysis for side impact tests
 - Generate 10,000 contours
 - Data output is compatible with Microsoft Excel

Crash Test Data Analysis

Patrick J. McNaull Alexander C. Mehlman Jonathan R. Salontay Micah J. Scott Trey A. Shepherd
 Advisors: Dr. Juliet Hurtig Dr. John-David Yoder

Begin a new simulation

Enter Number of Gages Encircling Subject:

Select either a 2D overhead or 3D translation analysis.

Analysis Type

2D Analysis

3D Translation

Band Orientation

Clockwise

Counterclockwise

Input Units / Output Units

Metric(mm) / Metric(mm)

Metric(mm) / English(in)

English(in) / English(in)

English(in) / Metric(mm)

Program Setup

Active Band Length:

Distance Between Each Gage:

Gage Closest to Spine:

Desired # of Contours:

Note: Band Length and Distance must be in selected input units

File Specification

Strain Gage Data Input File:

Accelerometer Data Input File:

Output File Path:

Input Rotational Velocity

deg/sec

rad/sec

Gage Selection

Gage 1	<input checked="" type="checkbox"/>	Active	Gage 21	<input checked="" type="checkbox"/>	Active
Gage 2	<input checked="" type="checkbox"/>	Active	Gage 22	<input checked="" type="checkbox"/>	Active
Gage 3	<input checked="" type="checkbox"/>	Active	Gage 23	<input checked="" type="checkbox"/>	Active
Gage 4	<input checked="" type="checkbox"/>	Active	Gage 24	<input checked="" type="checkbox"/>	Active
Gage 5	<input checked="" type="checkbox"/>	Active	Gage 25	<input checked="" type="checkbox"/>	Active
Gage 6	<input type="checkbox"/>	Active	Gage 26	<input checked="" type="checkbox"/>	Active
Gage 7	<input checked="" type="checkbox"/>	Active	Gage 27	<input checked="" type="checkbox"/>	Active
Gage 8	<input checked="" type="checkbox"/>	Active	Gage 28	<input checked="" type="checkbox"/>	Active
Gage 9	<input checked="" type="checkbox"/>	Active	Gage 29	<input checked="" type="checkbox"/>	Active
Gage 10	<input checked="" type="checkbox"/>	Active	Gage 30	<input type="checkbox"/>	Active
Gage 11	<input checked="" type="checkbox"/>	Active	Gage 31	<input checked="" type="checkbox"/>	Active
Gage 12	<input checked="" type="checkbox"/>	Active	Gage 32	<input checked="" type="checkbox"/>	Active
Gage 13	<input checked="" type="checkbox"/>	Active	Gage 33	<input checked="" type="checkbox"/>	Active
Gage 14	<input checked="" type="checkbox"/>	Active	Gage 34	<input checked="" type="checkbox"/>	Active
Gage 15	<input checked="" type="checkbox"/>	Active	Gage 35	<input checked="" type="checkbox"/>	Active
Gage 16	<input checked="" type="checkbox"/>	Active	Gage 36	<input checked="" type="checkbox"/>	Active
Gage 17	<input checked="" type="checkbox"/>	Active	Gage 37	<input checked="" type="checkbox"/>	Active
Gage 18	<input checked="" type="checkbox"/>	Active	Gage 38	<input checked="" type="checkbox"/>	Active
Gage 19	<input checked="" type="checkbox"/>	Active	Gage 39	<input checked="" type="checkbox"/>	Active
Gage 20	<input checked="" type="checkbox"/>	Active	Gage 40	<input checked="" type="checkbox"/>	Active

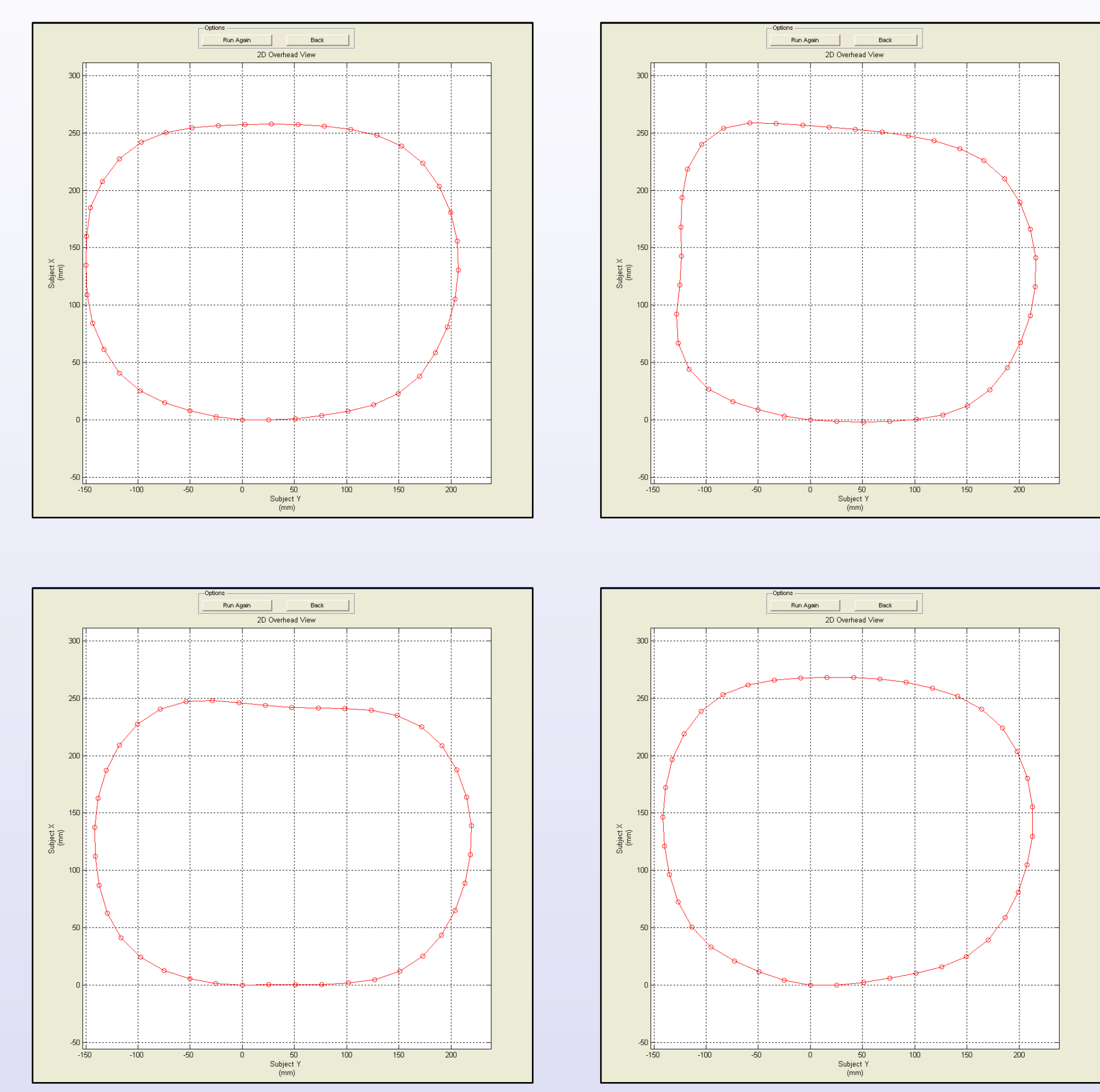
Enter setup information about the chestband and the number of contours to simulate over time.

Specify input files for the strain gage and accelerometer data and create a new output file for the results.

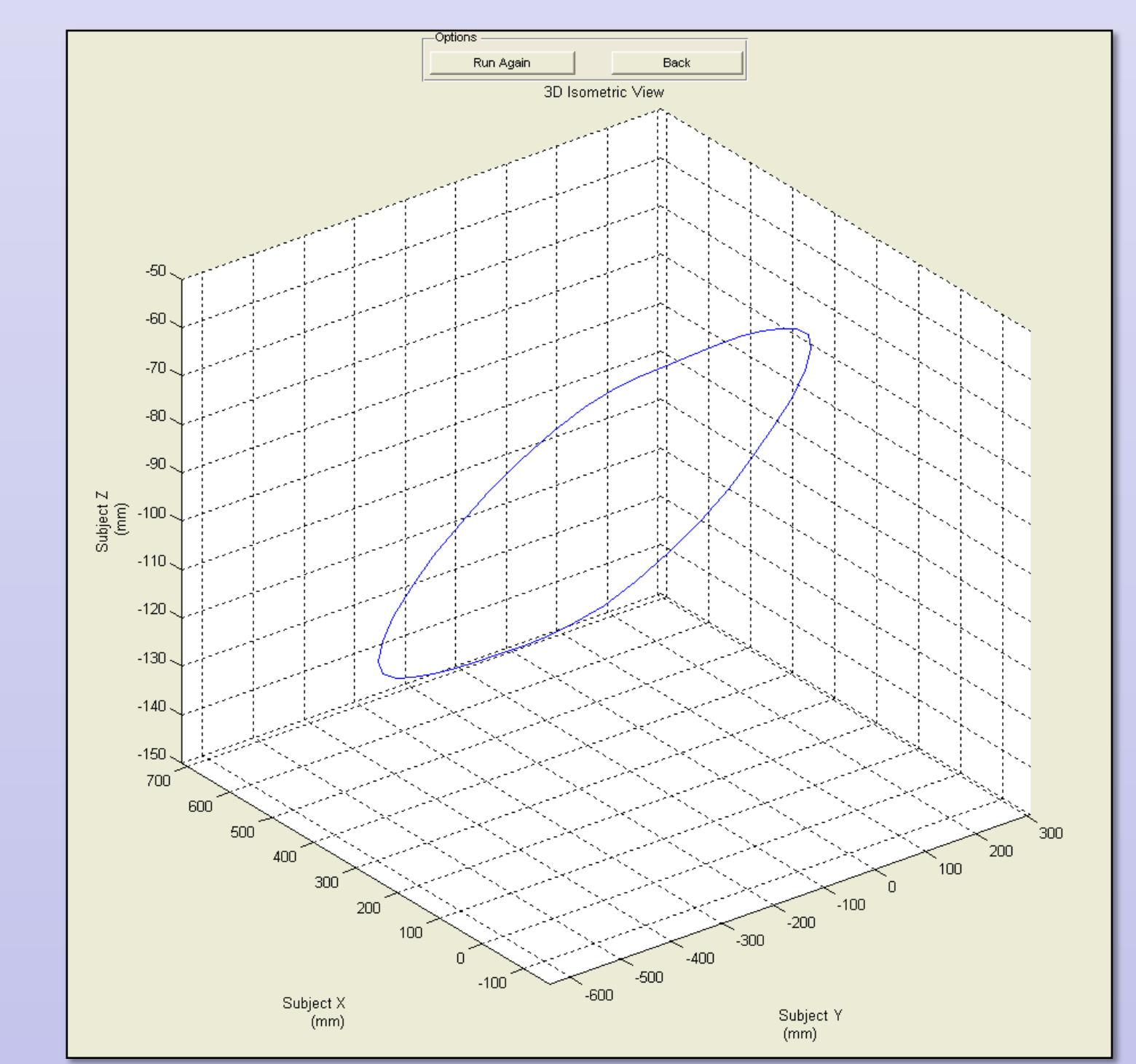
Select the status of each chestband gage.

Click execute to begin the simulation. The simulation performs the basic steps explained below.

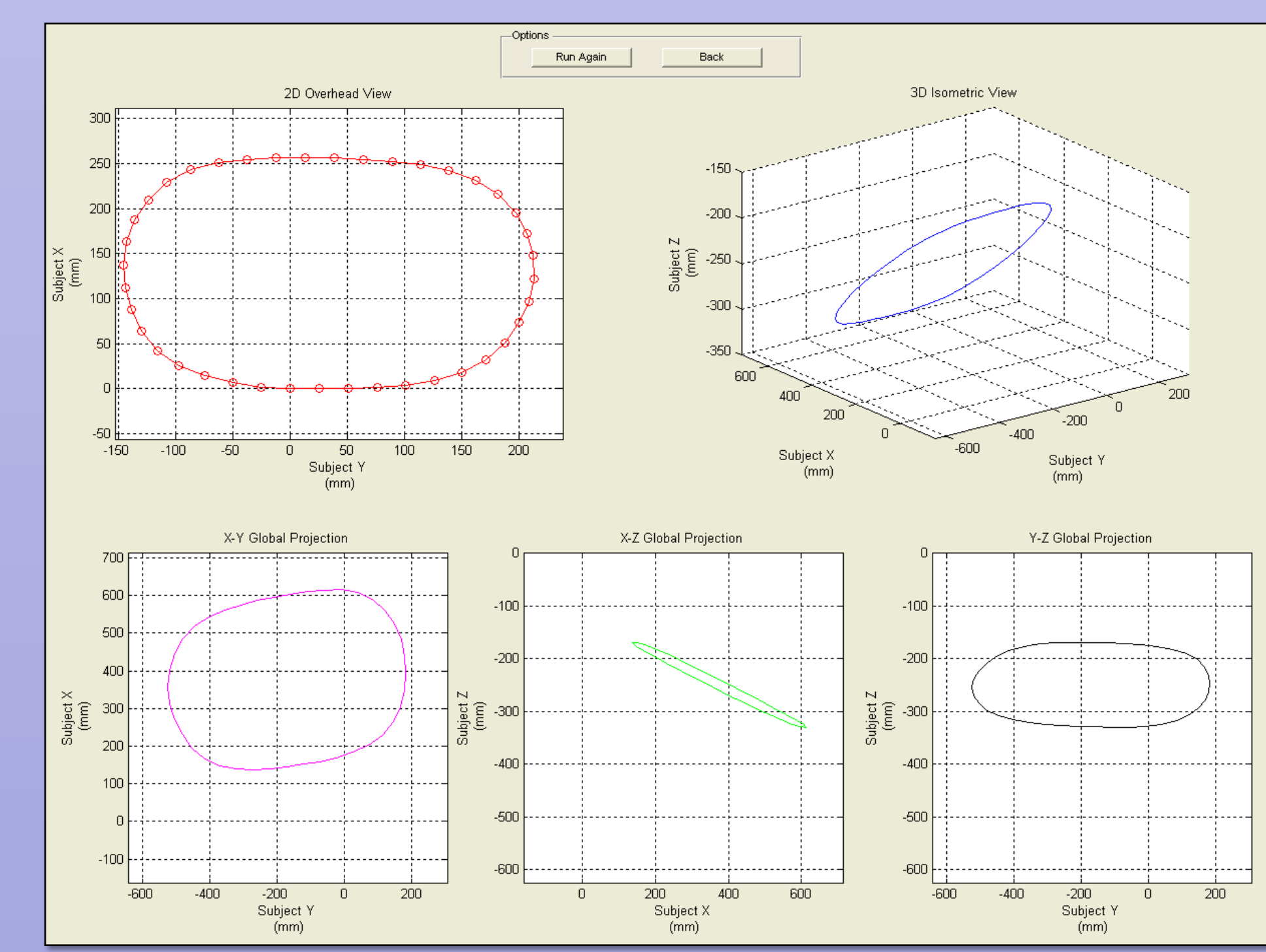
2D Overhead Plots



3D Isometric Plot



3D Orthographic Plots



Processes performed upon execution:

- 1 Read in curvature and accelerometer data from a Microsoft Excel file.
- 2 Average and numerically integrate the raw experimental data.
- 3 Generate 2D contours from curvature data.
- 4 Apply translation and rotation data to 2D contours.
- 5 Create a new output file in Microsoft Excel.
- 6 Generate any of the three plot types shown to the right.