Motivation

To fully understand the mechanics of the human ankle.

Further develop the understanding of biped mobility.

Further research into autonomous biped motion.
Identify the roles of the three bearing surfaces on the calcaneus and talus, as they pertain to human gait.
Previous Results

- Prior research done by Antonio Paulic, on a single calcaneus and talus, indicates that the radius of curvature for the talus along an axis parallel to the inversion/eversion plane is coincident with a point on the calcaneus tuberosity facet.

- This research hopes to verify Paulic’s results, as well as provide a broader data base for research on the subtalar joint.
Procedure

- 4 left footed talus/calcaneus sets were laser-scanned with a Faro ScanARM and post processed using GeoMagic Studio software.
Results

- Post processing yielded accurate 3-D mesh CAD models of the 4 left footed talus/calcaneus sets.

The figure on the left is a 3-D mesh model of a talus, while the right hand figure is a mesh model of a calcaneus.
Continuing Work

- The 3-D Mesh models will be imported into AutoCAD and converted to a usable solid model.

- These solid CAD models will be manipulated to yield curve fits for the bearing surfaces.

- Then these curves will be used to determine the role of the specific bearing surface.
This process will be done for all 8 tarsal bones, to verify the accuracy and repeatability of the 3 bearing surfaces of the subtalar joint.
Conclusion

- It is hoped the curve fits will give insight into the roles of the bearing surfaces.

- It is also hoped that these models will validate the results obtained previously by Antonio Paulic, specifically that the radius of curvature of the calcaneus is coincident to the tip of the heel.