Specific Aim 1: Train and supervise personnel at each recruitment site to ensure collection of standardized data.

During the first year of this collaborative project, three imaging systems were purchased. A focus of this core was to ensure that each system was fully operational before it was sent out into the field for data collection. This was accomplished in the following fashion:

A. Quality Control and Set-up
- A pilot study was completed wherein we reacquired data from 10 of the original pilot study subjects to provide cross calibration assessment with one of the new cameras.
- Further studies were completed comparing the new cameras that were ordered on the grant. Preliminary analysis shows the cameras are on par with each other with respect to accuracy. These captures are currently undergoing more detailed analysis.
- Finally the AVL worked with Dr. Rick Ward, Dr. Elizabeth Moore and Carol Miller in the process of acquiring a standard model to "calibrate" cameras at remote sites. The model has arrived and will be used for calibration off site.
- In addition the AVL assisted Dr. Shiaofen Fang by scanning a plaster dental model provided by Dr. Ken Jones. The scanned data has yet to be merged into a single model. After merging the data will be sent to Dr. Fang for further analysis.

B. Camera Acquisition and Deployment
- The first camera was sent to Buffalo, NY (Luther Robinson). Jeff Rogers a member of our core, then went to Buffalo to help set up the system and refresh Dr. Robinson and his staff with data collection. Remote support has been scheduled for the months of May and June. The camera will remain in Buffalo for several months while data is being collected. The camera's next destination will be San Diego or the Plains where we will continue to provide remote support.
- The second camera was sent to Finland (Eugene Hoyme). Following long custom delays, the camera was released and Jeff Rogers is providing long distance technical support. With the scan of 2 subjects thus far, all appears to be operating smoothly. This camera will remain in Finland for a few months. The camera's next destination will be Moscow where we will continue to provide remote support
- A third camera was ordered with INGEN provided funds.

C. Software Development
- AVL developed a custom plug-in module for the Rapidform software. This module is specifically designed for FAS data point entry, examination and measurement extraction. The alpha version is ready to be deployed to Dr. Elizabeth Moore and Dr. Rick Ward. We are waiting on Dr. Moore's laptop to arrive for software installation. Upon deployment the AVL will train Dr. Moore and Dr. Ward and enhance the interface where requested. Documentation for this plug-in is currently in production.
- The details of the capture protocol documents were updated and are included as a hard copy inside each camera case.
- Andy Arenson of the Informatics Core and Jeff Rogers from our Facial Imaging Core, met to discuss the XML file format that will be extracted with the Rapidform plug-in and read into the Central Repository. This XML file will contain measurement information and is the essential link between the Imaging Core and Central Repository. The Imaging Core will create one measurement file per scanned subject and the Central Repository will read the data from the file. The AVL is

waiting on Andy to finalize the file format. In addition we will add one 3D merged Rapidform file per subject into the repository. This file is meant to be freely available to all participants using the freeware version of Rapidform.

Specific Aim 2: Analyze the 3-D facial imaging data to identify the measurements that most efficiently differentiate alcohol exposed from control subjects.

Data has thus far only been collected at two sites. Initial analyses have consisted primarily of quality checks using the data collected at Buffalo. We anticipate performing initial data entry once the protocol is completed at the Buffalo, NY site.

Specific Aim 3: Utilize algorithms and methods derived from the emerging field of Automated Facial Recognition (AFR) to extract and identify the most discriminating higher order surface features from 3-D facial images, with the goal of developing an automated method of identifying facial features diagnostic of prenatal alcohol exposure.

Drs. Feng and Huang will be initiating studies from previously collected 2-D data to initiate this specific aim. As data is received from Buffalo, NY and other sites, Drs. Feng and Huang will initiate studies to explore this aim.

Specific Aim 4: Combine the results from the direct and higher order measurements derived from the 3-D facial imaging with variables collected from other study domains to improve the power to accurately discriminate alcohol exposed from control subjects and to better understand the pathophysiological effects of ethanol on human development.

Analyses for this specific aim are not anticipated to begin until the 3rd year of the study.

B. Significance

Fetal alcohol syndrome is the most common nonhereditary cause of mental retardation. A number of studies have examined different populations both within the United States and throughout the world to estimate the incidence and prevalence of this devastating syndrome. It is estimated that the prevalence in the general population of FAS is likely to be between 0.5 and 2.0 per 1,000 births. Broadening the clinical definition, to also include ARBD with FAS, results in a combined prevalence estimate of at least 10 per 1,000 births, or 1% of all births. Importantly, studies outside the U.S. have found even higher rates of prevalence in particular geographic regions. It was estimated, over a decade ago, that the incremented annual cost of treating individuals with FAS is $74.6 million. About three-quarters of this economic burden is associated with care of FAS cases having mental retardation

C. Plans

During the next year, we will use study funds to purchase another imaging system which will be dedicated for use in South Africa. The rate of subject collection is anticipated to increase rapidly and we will continue to support the training of new collaborative investigators in the use of the imaging systems as well as support their transfer of data. It is anticipated that data analysis will be actively underway within a few months.

D. Publications and Abstracts
None

E. Project-Generated Resources
None

F. Inventions and Patents
None