SHOT:	AUDIO:
Student Video Intro's: each team member introduces themselves (filmed in building 647, our office)	None
Video clips filmed at NASA Langley Research Center: Clip of sign in front of main NASA gate. Clip of Gantry at NASA Langley Research Center.	None
Brown water from agriculture drainage: Public video clip from www.archive.org	None
Old tractor, excessive tillage: Public video clip from www.archive.org	None
Field overlooks/ cropscape shot	None
Show fields and cattle Public video on www.archive.org : Video made by the University of Vermont	Concerns about climate change have driven efforts to reduce or offset greenhouse gas emissions. Agricultural activity has drawn considerable attention because it accounts for nearly twelve percent of total anthropogenic carbon emissions, which are those caused by humans. The magnitudes of these emissions can be positively or negatively influenced by agricultural practices.
Show conservation tillage fields with residue: Public video on www.archive.org : Video made by the University of Vermont	One of the most widely adopted 'Best Management' practices, known as conservation tillage, preserves soil nutrients, sequesters carbon and decreases sediment runoff by placing crop residue on agricultural surfaces and leaving the soil intact.
Soil effects and benefits graphs	Conservation tillage involves drilling small holes for aeration and covering the soil with otherwise unusable crop residue (leaves, stalks, etc.) Conservation tillage differs from conventional tillage because it leaves the soil more intact: this is helpful for protecting nutrients and sequestering carbon. Conservation tillage has also been celebrated for it properties as an erosion deterrent for both sediment and fertilizers.
State Building JPEG	In Virginia, there is a tax credit up to $4000 for those who can show purchase receipts for conservation tillage equipment. The collection of these receipts and the dated line-transect method are the only current ways to track the prevalence of conservation tillage in Virginia. The need has arisen for a new, less-intensive observation technique.
Tillage Monitoring Methods (slide)	Using a USGS agricultural tillage practice study, we were able to examine tillage practices in VA from 89 to 04. As you can see here in the maps, agricultural tillage practices such as no till which is

	a conservational tillage type has increased significantly in VA during this time period.
Show corn to satellite: Animation of Earth with NASA sensor circling.	Using remote sensing data to distinguish high and low crop residue soil cover would be ideal in allowing government agencies to verify conservation practices regardless of physical distance. The results of this discretionary data would be helpful to any government agency or information center interested in monitoring tillage practices with or without access to ground truthing points.
Objectives being typed (Power point)	• 1) To validate the efficacy of 3 spectral models on Landsat data for distinguishing conventional and conservational tillage (NDTI, M15, and R15). • 2)Verify the accuracy of a CAI algorithm produced using Hyperion data and clipped to specific crop types Soybean (96.9% no-till) Corn (86.4% no-till)
Show Landsat slide 1 (Power point)	Landsat, which is not as "banded" as Hyperion data, was available in our study area. To distinguish crop residues and tillage types, we employed three spectral models NDTI (B5-B7)/(B5+B7), R15 (B1/B5), and M15 (B1-B5)/(B1+B5). Our goal was to determine which method could best pick up our crop residue in Virginia. We hope to share our results with Dr. Ronald Follett of the USDA to determine which model most accurately matches up with their ground truthing data.
Show landsat slide 2 (images)	From 2000 – 2004 Dr. Follet with the USDA performed a tillage study on four counties in eastern VA; these counties include king William, James city, Charles city, and New Kent. For our Landsat scenes we clipped them to match up with the four counties and masked our images to only incorporate agricultural land use. This slide shows the spectral models M15, R15, NDTI for March, May and October for 2001. Both models M15 and R15 were able to pick up crop residue for our four counties however, NDTI had extremely low pixel counts for crop residue.
Hyperion Models slide (Power point)	To better understand how spectral response for conservational tillage practice could be measured, we relied on Hyperion satellite data to display the

	differences between spectral responses by crop types. In order to accomplish this, we first had to change the raw radiance values of the Hyperion data to reflectance values using the following algorithm.
CAI Model slide (Power point)	After converting the Hyperion data to reflectance data, we processed the data by clipping it to specific crop types and then created a cellulose absorption index in Arc GIS.
Hyperion Corn images (Power point)	Corn on the eastern shore of VA is widely farmed using conservational tillage practices. We examined the cellulose absorption indices for corn fields in the year 2010. Throughout the farming cycle of tilling, planting, growing, and harvesting, cellulose levels in these fields remained relatively high. This suggests that conservational tillage is taking place on the eastern shore.
Hyperion Soy bean images (Power point)	To better understand variances and CAI's between crop types we also examined soy beans, another crop that widely utilizes conservational tillage practices on the eastern shore. The images showed us that while conservational tillage is being practiced on the eastern shore, the spectral response for cellulose is not as high as it was with corn.
Final video: Joe and Anastazia speak on passing work to partners. Video filmed in front of NASA building at Langley Research Center.	Our project had two partners. 1 Baojuan Zheng, a graduate student from Virginia Tech is doing a similar study using Landsat data to produce NDTI's. Zheng is interested in receiving our results to compare with her current study. 2. Dr. Ronald Follett with the USDA, had done a tillage study on the four counties we covered from 2000-2004. We will be handing over our results to eventually run logistic regression models with his ground truthing data. This will determine the accuracy of our results.