

June 1, 2012

Mr. Joseph Young  
Mapping Coordinator  
Maine Floodplain Management Program  
Maine Department of Conservation  
22 State House Station  
17 Elkins Lane  
Augusta, Maine 04333

**RE: Maine Statewide LiDAR Acquisition and Processing**

Dear Mr. Young:

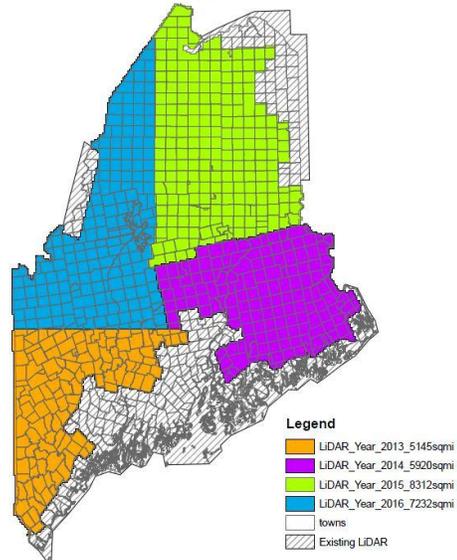
Woolpert is pleased to submit our 4-Year Statewide LiDAR Proposal. The new LiDAR proposed will cover areas throughout Maine not already covered by LiDAR, equating to approximately 26,612 square miles of new LiDAR. Woolpert will provide the following photogrammetric services:

## Project Area

The picture to the right illustrates the proposed acquisition and processing of new LiDAR for the State of Maine. The plan is tied to closely mimic the aerial imagery acquisition over the next four years. The aerial imagery acquisition plan is shown on the following page for reference. The size of each of the four areas is shown below:

- 1) 2013 - 5,145 square miles
- 2) 2014 - 5,921 square miles
- 3) 2015 - 8,314 square miles
- 4) 2016 - 7,232 square miles

Maine 1.5-meter NPS LiDAR  
Projected Collection Years 2013-2016  
May 31, 2012



## Existing Aerial Imagery Acquisition Plan

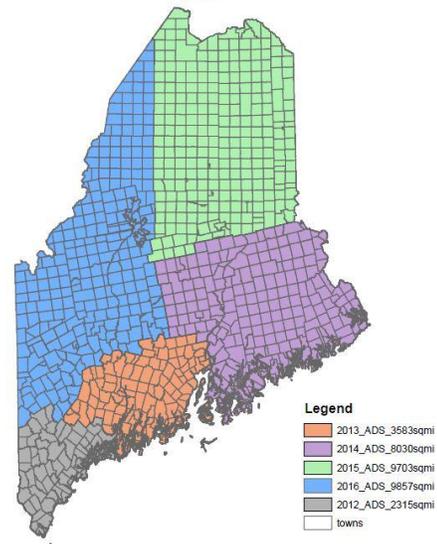
Shown to the right is the existing plan for the acquisition of aerial imagery (referenced above).

## Services

### Aerial LiDAR

Woolpert will acquire new aerial LiDAR at an average point density of 1.5-meters. The LiDAR will be acquired during the spring flying season, when deciduous trees are free of leaves, rivers/streams are within their banks and the ground is free of snow and standing water.

Maine Orthoimagery  
Projected Collection Years 2013-2016  
May 31, 2012



### LiDAR Processing

Woolpert will obtain new LiDAR data at an average post spacing of 1.5 meters with a buffer of 500-meters past the Town's boundary. The unprocessed LiDAR will consist of at least the first and last returns. The new LiDAR data will be obtained for the required project areas and consist of point number, X coordinate, Y coordinate and Z coordinate, along with an intensity value. Woolpert will obtain and process the LiDAR data according to the "U.S. Geological Survey National Geospatial Program Base LiDAR Specification, Version 13".

Woolpert will not be using land use category test areas. Woolpert will establish 20 test points for each project area. These points will be carefully planned and equally distributed over the project area. They will be located in open terrain, where there is a high probability that the sensor will have detected the ground surface, without influence from the surrounding vegetation. The checkpoints will be located on flat or uniformly sloping terrain and will be at least five (5) meters away from any breakline and where change in slope doesn't exceed 20°. The accuracy of the bare-earth will be 15cm accuracy or better.

The Spatial Reference System will be: UTM Zone 19, NAD83/2007, Meters; NAVD88, Meters. Data will reference the geoid model of 2009 (Geoid 09).

## Hydro-Flattening

Woolpert will perform hydro flattening on the new LiDAR data sets in accordance with U.S. Geological Survey National Geospatial Program Base LiDAR Specification, Version 13 as a guideline.

In order to achieve hydrologic flattening of the LiDAR DEM, Woolpert will perform the following in conjunction with the LiDAR data:

Breaklines will be used to perform the hydrologic flattening of water bodies, and the gradient hydrologic flattening of double line streams. Lakes, reservoirs and ponds, at a nominal minimum size of two (2) acres or greater (~350' feet in diameter for a round pond), will be compiled as closed polygons.

Breaklines for rivers, creeks, and streams, with a nominal minimum width of 100-feet, will be compiled in the direction of flow, with both sides of the stream maintaining an equal gradient elevation.

## Deliverables

### *LiDAR DEM*

- LiDAR Report - June of each acquisition year
- Raw LiDAR data (point cloud) in LAS v1.2 format files size not to exceed 2 GB
- LiDAR Classified data in LAS v1.2 format
- ESRI 10 shapefile of flightlines with acquisition dates
- ESRI 10 shapefile of control points
- ESRI 10 shapefile of tile index
- Each deliverable product will include FGDC metadata
- LiDAR Report - pdf and hard copy

### *Hydro-Flattening*

- Hydro Breaklines in Esri 10 shapefile format
- Hydro Flattened DEM derived at 1-meter pixel, delivered in Esri 10 ArcGrid format

## Schedule

Once a final plan has been decided, the State of Maine and Woolpert will determine the final delivery schedule for each year's LiDAR Deliverables.

## Estimated Fees

<b>LiDAR Option 1 – 4-Year Plan</b>	
26,612 Square Miles (Total Project Area)	
<i>Deliverable</i>	<i>Fee</i>
<b>LiDAR DEM</b>  Includes:  1) Aerial Acquisition 2) Ground Control 3) LiDAR Processing 4) Delivery of the LiDAR DEM (LAS Format)  Does not include: Hydro-Flattening	\$3,248,260.72 OR \$122.06/Square Mile
<b>Hydro-Flattening</b>  Includes:  1) Hydro-flattening	\$920,775.20 OR \$34.60/Square Mile
<b>Grand Total</b>	<b>\$4,169,035.92</b>

The estimate above is based upon acquiring and processing 26,612 square miles of aerial LiDAR.

One the following pages, we have provided a breakdown for each of the four proposed delivery areas:

<b>LiDAR Option 1 – Year 2013</b>	
5,145 Square Miles	
<i>Deliverable</i>	<i>Fee</i>
<b>LiDAR DEM</b>  Includes:  1) Aerial Acquisition 2) Ground Control 3) LiDAR Processing 4) Delivery of the LiDAR DEM (LAS Format)  Does not include: Hydro-Flattening	\$627,998.70 OR \$122.06/Square Mile
<b>Hydro-Flattening</b>  Includes:  1) Hydro-flattening	\$178,017.00 OR \$34.60/Square Mile
<b>Grand Total</b>	<b>\$806,015.70</b>

<b>LiDAR Option 1 – Year 2014</b>	
5,921 Square Miles	
<i>Deliverable</i>	<i>Fee</i>
<b>LiDAR DEM</b>  Includes:  1) Aerial Acquisition 2) Ground Control 3) LiDAR Processing 4) Delivery of the LiDAR DEM (LAS Format)  Does not include: Hydro-Flattening	\$722,717.26 OR \$122.06/Square Mile
<b>Hydro-Flattening</b>  Includes:  1) Hydro-flattening	\$204,866.60 OR \$34.60/Square Mile
<b>Grand Total</b>	<b>\$927,583.86</b>

<b>LiDAR Option 1 – Year 2015</b>	
8,314 Square Miles	
<i>Deliverable</i>	<i>Fee</i>
<b>LiDAR DEM</b>  Includes:  1) Aerial Acquisition 2) Ground Control 3) LiDAR Processing 4) Delivery of the LiDAR DEM (LAS Format)  Does not include: Hydro-Flattening	\$1,014,806.84 OR \$122.06/Square Mile
<b>Hydro-Flattening</b>  Includes:  1) Hydro-flattening	\$287,664.40 OR \$34.60/Square Mile
<b>Grand Total</b>	<b>\$1,302,471.24</b>

<b>LiDAR Option 1 – Year 2016</b>	
7,232 Square Miles	
<i>Deliverable</i>	<i>Fee</i>
<b>LiDAR DEM</b>  Includes:  1) Aerial Acquisition 2) Ground Control 3) LiDAR Processing 4) Delivery of the LiDAR DEM (LAS Format)  Does not include: Hydro-Flattening	\$882,737.92 OR \$122.06/Square Mile
<b>Hydro-Flattening</b>  Includes:  1) Hydro-flattening	\$250,227.20 OR \$34.60/Square Mile
<b>Grand Total</b>	<b>\$1,132,965.12</b>

We appreciate the opportunity to present this price proposal. If you have any questions or need further clarification regarding the above, please call me at 614.827.6155. I can also be reached via my e-mail address: [brian.stevens@woolpert.com](mailto:brian.stevens@woolpert.com).

Sincerely,

**WOOLPERT Inc.**

Brian Stevens, CP  
 Project Manager