Land & Energy Development
Solutions from the ground up.

PROJECT NAME: SEALED BID

West Virginia Dept. of Environmental Protection

Office of Abandoned Mine Lands & Reclamation

Mapping Services in Northern Counties of WV

RECIPIENT: BUYER: Beth A. Collins, Senior Buyer

SOLICITATION NUMBER: CRFQ 0313 1600000017

BID OPENING DATE: October 29, 2015

BID OPENING TIME: 1:30 p.m.

FAX NUMBER: 304-462-5656

DATE: October 29, 2015

slssurveys.com

P.O. Box 150 12 Vanhorn Drive Glenville, WV 26351
Tel: (304) 462-5634 Fax: (304) 462-5656

56065 Dilles Bottom Road Shadyside, OH 43947
Tel: (470) 671-9911

CONTENTS

Company Overview

Professional Energy Consultants, the largest division of Smith Land Surveying, Inc. (SLS), is a full-service energy consulting company. Our departments include Surveying, Engineering, CADD, GIS, Environmental, Water Sample Collection, Construction, Regulatory Permitting, Quality Control, Compaction Inspection and Printing Services. Today, we employ sixty (60) individuals and have the ability to send ten (10) separate crews to the field daily. We consider our company to be the leading energy consultant in West Virginia. With a branch office in Shadyside, Ohio, we will be bringing our quality project management to Ohio. We feel we are positioned to be a major contributor in the energy industry for many years to come.

Company History

1978 – SLS was founded by Gregory A. Smith with one (1) employee. During these first years, SLS provided boundary, construction and oil and gas well location survey services. SLS experienced steady growth, employing two (2) to three (3) new people a year.

1982 -- SLS began providing design data surveys to many architectural and engineering firms throughout the state.

1986 -- SLS further diversified its base by forming an Environmental Service Group providing oil and gas drilling pit waste disposal, independent lab support, water sampling, and erosion and sediment control plans (E&S).

1988 – SLS formed a Reclamation Group responsible for providing implementation of E&S Plans and NPDES Permits on both the Commercial and Oil & Gas sites. SLS provided seeding and mulching services for numerous Oil & Gas Producers who received Reclamation Awards at the annual meeting. As the Project Management and Reclamation Services grew, SLS expanded as a Contractor and provided turnkey constructed services on both Federal and State Contracts for Mine Reclamation Projects. SLS also provided turnkey services to Insurance & Bonding Companies for Mitigation and Bond Forfeiture Projects.

1991 -- SLS began providing coordination and project management for Developers for Engineering and Architectural services for Shopping Centers and various Retail Outlets, Environmental Site Assessment Reports (ESA Phase I), along with NPDES Permits being added to accommodate our commercial services.

1996 -- SLS added a Land Department to assist members of the oil and gas industry with identifying tract or parcel ownership and obtaining right-of-way agreements & mineral leases. This led SLS to developing our Midstream Services. Midstream Services range from pipeline route selection, acquisition, mapping/surveys, and both environmental and regulatory permits, along with a complete project management staff that can assist with your operational needs.

1996 – 1999 -- SLS provided surveying, mapping and minor engineering services for the West Virginia School Building Authority, U.S. Federal Bureau of Prisons and the Natural Resources Conservation Service at the Hughes River Dam.

1998 – Present – SLS' focus has been serving existing clients in the oil, gas and coal industries, the West Virginia Department of Transportation (D.O.T.) and the West Virginia Department of Environmental Protection.

2012 -- SLS formed Professional Energy Consultants to meet the changing needs of our energy industry clients. Combining resources with our affiliate companies, SLS provides a "single source" asset for surveying, engineering, environmental and project management services which can provide a full turnkey package for construction site development where your site is ready to drive the rig on and drill.

Noteworthy

SLS keeps informed of changes in legislative rules and regulatory permit requirements affecting our industry by maintaining regular correspondence with state and local government agencies. Our longstanding association with government, regulatory, and commercial entities proves to be a valuable asset during the planning, design, and construction management phases of various projects that we undertake on behalf of our clients.

SLS' projects routinely require our employees to travel throughout West Virginia and neighboring states. Technical and support personnel utilize fuel efficient vehicles to obtain field and research information. SLS maintains ten (10) completely equipped four-wheel drive vehicles with ATVs and phones with internet access, as well as six (6) additional four-wheel drive vehicles so that we can access even the most remote locations.

SLS promotes professional development through continuing education and involvement in professional organizations and associations. Our senior staff is actively involved in professional societies and regulatory and licensing processes. SLS regularly provides in-house training and sends employees to state and nationally sponsored seminars. Our core of professionals has over two hundred fifty (250) years of combined experience and is supported by an outstanding group of technical individuals, many of which are Surveyors-in-Training (SITs) and Engineers-in-Training (EITs).

Legal Business Name: Smith Land Surveying, Inc.

Vendor Code: 000000205829

P.O. Box 150, 12 Vanhorn Drive, Glenville, WV 26351
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Smith Land Surveying ftp Site

Pursuant to section 5.1 referencing ordering a payment in the request for quotation, SLS uses Citrix Share File (ftp site). Files can easily be shared outside a network, simply by having a SLS administrator send a post link through to the recipient's email.

Once the recipient receives the link they select the files to be sent and attach them to the page. The SLS ftp site is capable of storing up to 100 GB of data.

Once the link is sent with the attachments, the SLS administrator downloads the file and shares with the appropriate team member.

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T: (740)-671-9911

Auto CAD Version 2010 Documentation

12/30/2011

- Purchased 2 Network Carlson Survey 2012 from Surveyor Central (Invoice #2011-071)

02/01/2012

- Purchased 6 Carlson Survey (with embedded AutoCAD 2012) from Surveyor Central (Invoice #2012-001)

02/02/2012

- Purchased 4 licenses of AutoCAD 2012 from Tiger Direct (Order #F8801423)

09/03/2013

- Upgraded all network Carlson Civil and Survey to 2012 from Survey Central (Invoice #2013-030)

07/22/2014

- Purchased 2 licenses of AutoCAD 2012 from Integrated Software Solution (Order #37126)

Camera Calibration Certificate
No: DMC IIe 250 – 25521

For

Midwest Aerial Photography
7535 West Broad Street

Galloway, Ohio 43119

Manufacturer:	Z/I Imaging GmbH, D-73431 Aalen, Germany
Reference:	PAN
Serial Number:	00121780 (PAN Head)
Date of Calibration:	27. October 2014
Date of Report:	10. November 2014
Number of Pages:	

Calibration performed at: Carl Zeiss Jena, Carl-Zeiss-Promenade 10, 07745 Jena, Germany.

This camera system is certified by Z/I Imaging and is fully functional within its specifications and tolerances.

Date of Calibration: October 2014

Jürgen Hefele, Senior Software Developer

Date of Certification: November 2014

Dipl.Ing. Christian Müller, Product Manager

Camera Serial Numbers and Burn-In flight

Camera Head	Serial Number	Calib. Date
PAN (reference)	00121780	27.10.2014
MS1 (NIR)	00124702	27.10.2014
MS2 (Blue)	00124750	27.10.2014
MS3 (Red)	00124675	27.10.2014
MS4 (Green)	00124731	27.10.2014

Burn-In flight performed: 29. September 2014

Test block configuration

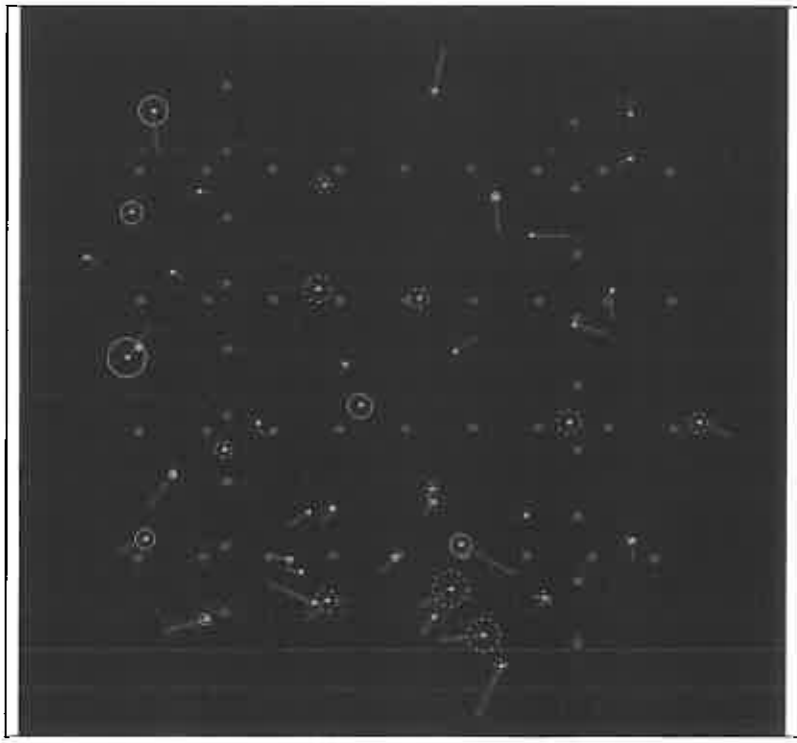


Photo Scale	1:8928.6
Flying Height [m]	1000 AGL
Flying Altitude [m]	1450 AMSL
Run-Spacing [m]	419.2
Base-Length [m]	210.2
Number of Exposures	54
Side-lap [%]	50
End-lap [%]	70
Terrain Height [m]	450
Number of strips	6
Photos in one strip	2 x 9 N-S 4 x 9 W-E
Photos Used	54
Control Points Used	5
Check Points Used	39
GSD [cm]	5

Aerial triangulation statistic results:

Parameter	X/...	Y/Phi	Z/K...	XY
RMS Control	0.014	0.009	0.005	0.012
RMS Check	0.019	0.019	0.028	0.019
RMS Limits	0.050	0.050	0.050	
Max Ground Residual	0.019	0.014	0.007	
Residual Limits	0.070	0.070	0.070	
Mean Std Dev Object				
RMS Photo Position				
RMS Photo Attitude				
Mean Std Dev Photo Po...				
Mean Std Dev Photo Atti...				

Key Statistics

Sigma:	1.3 um
RMS Image (x, y):	1.1, 0.9 um
Number of iterations:	2
Degrees of Freedom:	15421
Gross Image Blunders:	0
Gross Control Blunders:	0
Image Blunders:	0

Solution Status: Solution Successful.

Current Count

Control Points Used:	5
Check Points Used:	39
Photos Used:	54
Photos Not Used:	0
Image Points Used:	13205

Cameras used: (1).

Camera Id	Len...	Grids
DMC_II_250	Off	Off

Project Settings

Linear:	Meters	Refraction:	Off
Angular:	Degrees	Curvature:	Off

Deutsche Hauptdreiecksnetz - Gauss-Kruger (3-degree) (m)

The results of the aerial triangulation were generated with ImageStation Automatic Triangulation (ISAT), Version 2013, from Intergraph Corp. The maximum RMS in check points is ≤ 0.5 GSD in x,y and ≤ 0.7 GSD in z.

Aerial Triangulation performed by Dipl. Ing. C. Müller — 10.11.2014 Date

Geometric Calibration

The output image geometry is based on the Pan Camera head (reference head = master camera). All other camera heads are registered and aligned to this head. Aerial triangulation checks overall system performance based on.

Output image

Reference Camera	PAN	
Serial Number	00121780	
Number of rows/columns [pixels]	16768 x 14016	
Pixel Size [µm]	5.600 x 5.600	
Image Size [mm]	93.9008 x 78.4896	
Focal Length [mm]	111.9906 mm	+ /- 0.002 mm
Principal Point [mm]	X= 0.0208 mm Y= -0.0019 mm	+ /- 0.002 mm

The geometric calibration takes place at Carl Zeiss Jena on a certified test stand. More than 800 "light targets", projected on 28 lines that are distributed diagonally on the focal plane, are automatically measured by finding their centers light with a precision of less than 1/10 of a pixel. The light targets are projected from the "infinity" by using a collimator (Figure 1).

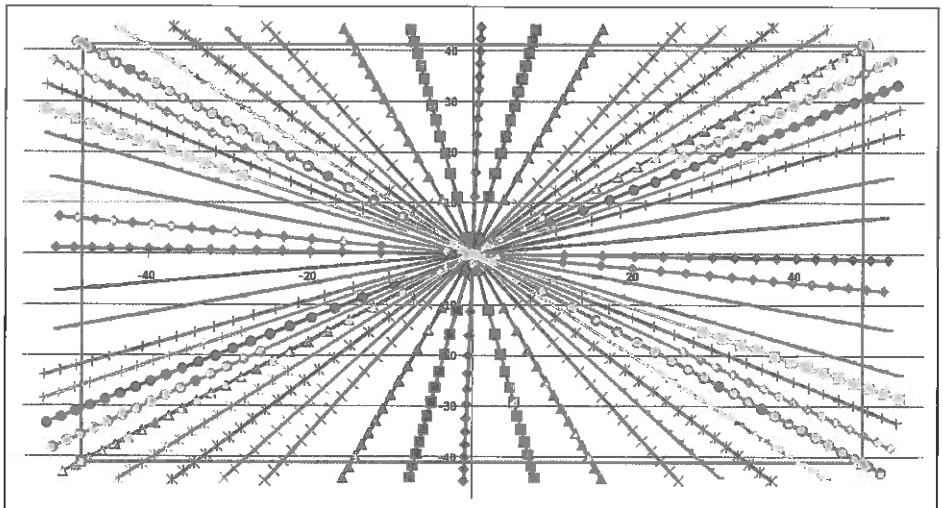


Figure 1: Light Target Pattern by Collimator

Geometric Calibration

Image Residuals

Figure 2 shows the image residuals, split in radial and tangential directions after the calibration adjustment. The maximum residuals are less than or equal to 1.5 microns and the RMSE values are below 0.5 microns.

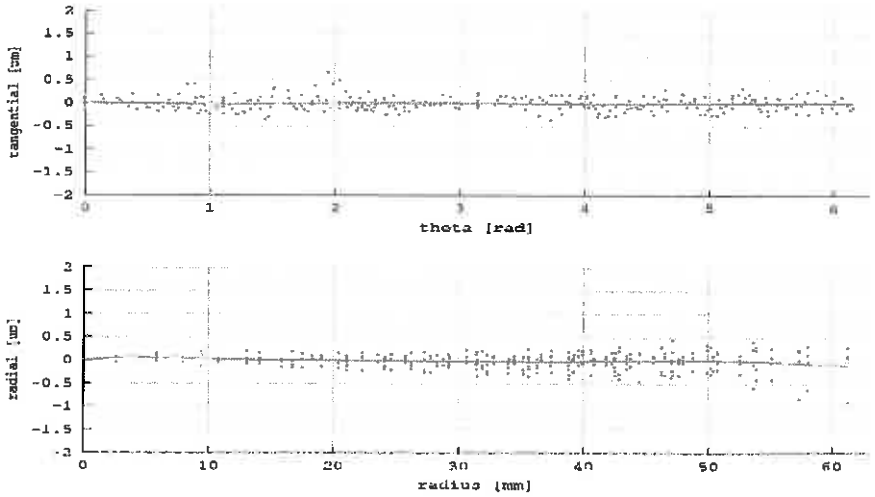


Figure 2: Tangential/Radial Distortion Residuals

Figure 3 shows the 2-D plot of the image residuals in mm.

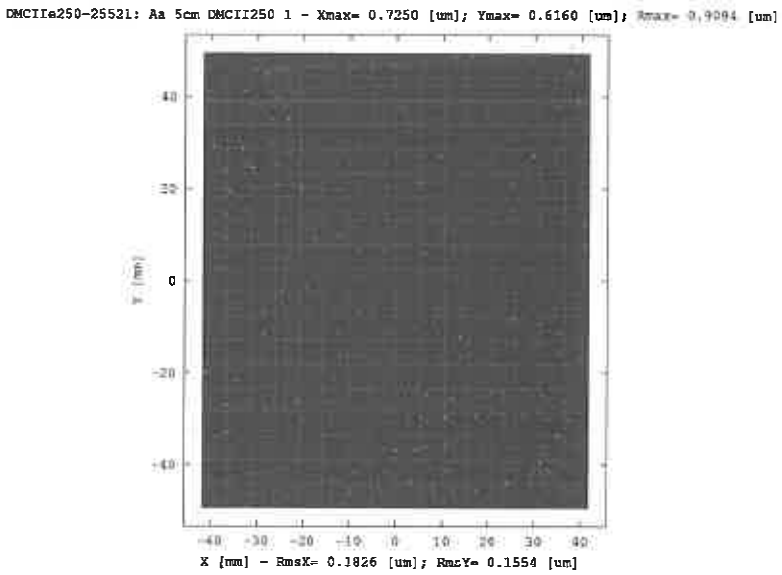


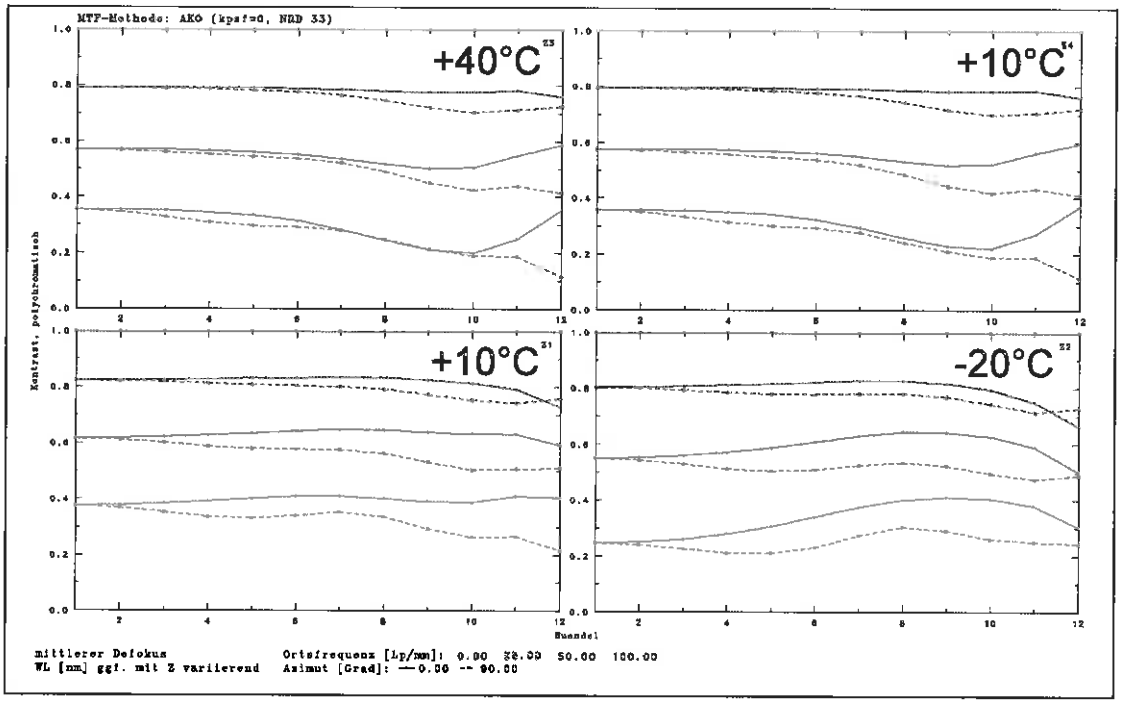
Figure 3: 2-D Image Residuals.

RMS < 0.19 um (maximum 0.73 microns)

Optical System

Modulation Transfer Function, MTF of PAN Camera (Reference)

DMC II PAN – MTF Polychromatic F/5.6 ; 112 mm – Temperature Stability

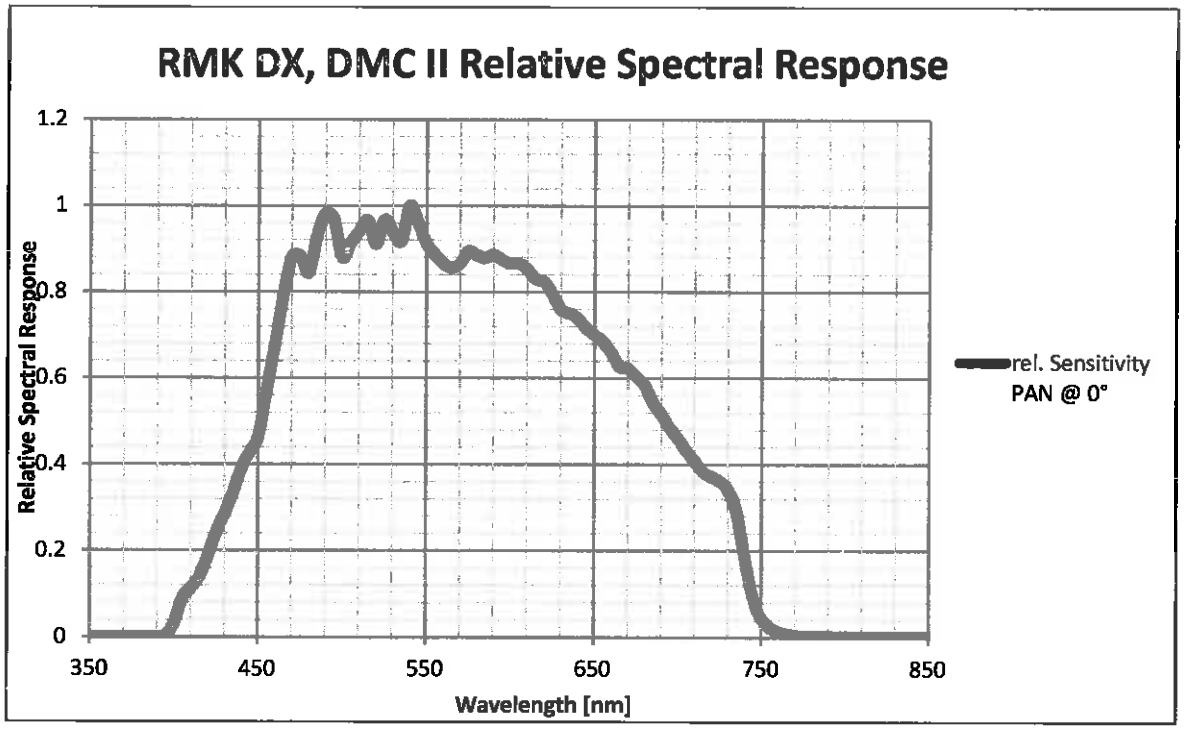


The MTF measurement is camera type specific and shows variation of the MTF within the specified temperature range.

This is a camera type specific measurement.

Radiometric Calibration

Sensitivity of PAN camera (Reference)



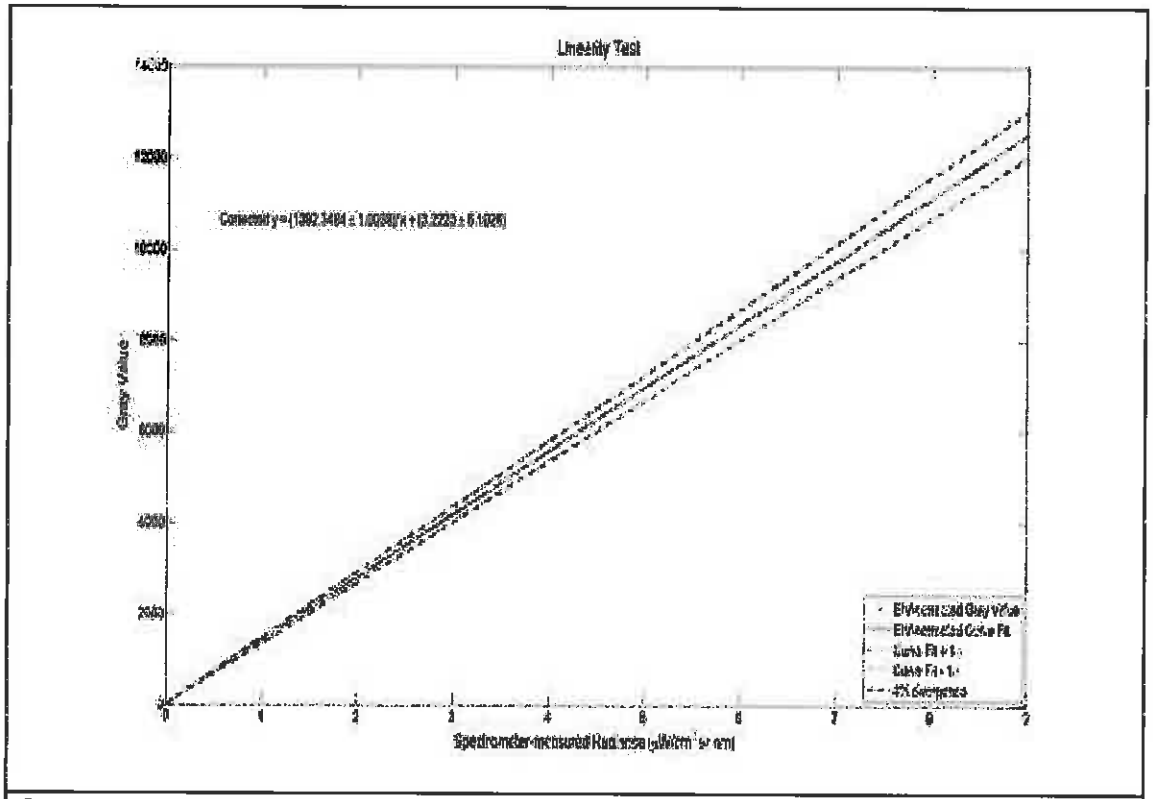
The sensitivity shows the spectral response curve of the single camera head including the optical system (optics, filter) and the sensor response. The DMC IIe 250 is calibrated with respect to the absolute spectrometer. This allows computing pixel radiance values from pixels digital numbers and is a camera type specific calibration.

This is a camera type specific measurement.

Radiometric Calibration

Sensor Linearity (Reference)

The sensor linearity is measured in the Lab with calibrated spectrometer. This is a camera type specific calibration.
Below figure shows the linearity of the raw sensor and after flat fielding:



Senor Linearity

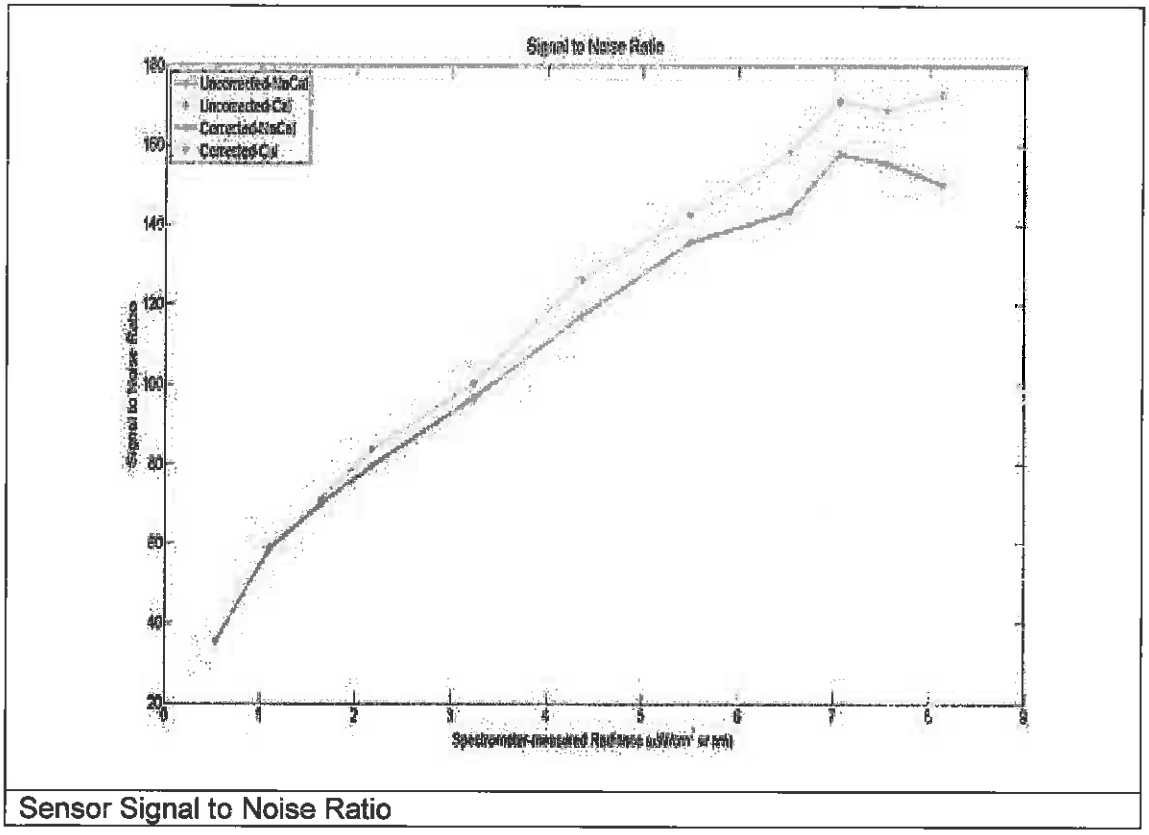
The deviation from the linearity is below 1%.

This is a camera type specific measurement.

Radiometric Calibration

Sensor Noise (Reference)

Sensor noise shows image noise with respect to the image center measured at an aperture of 16 with exposure time of 16msec.



Sensor Signal to Noise Ratio

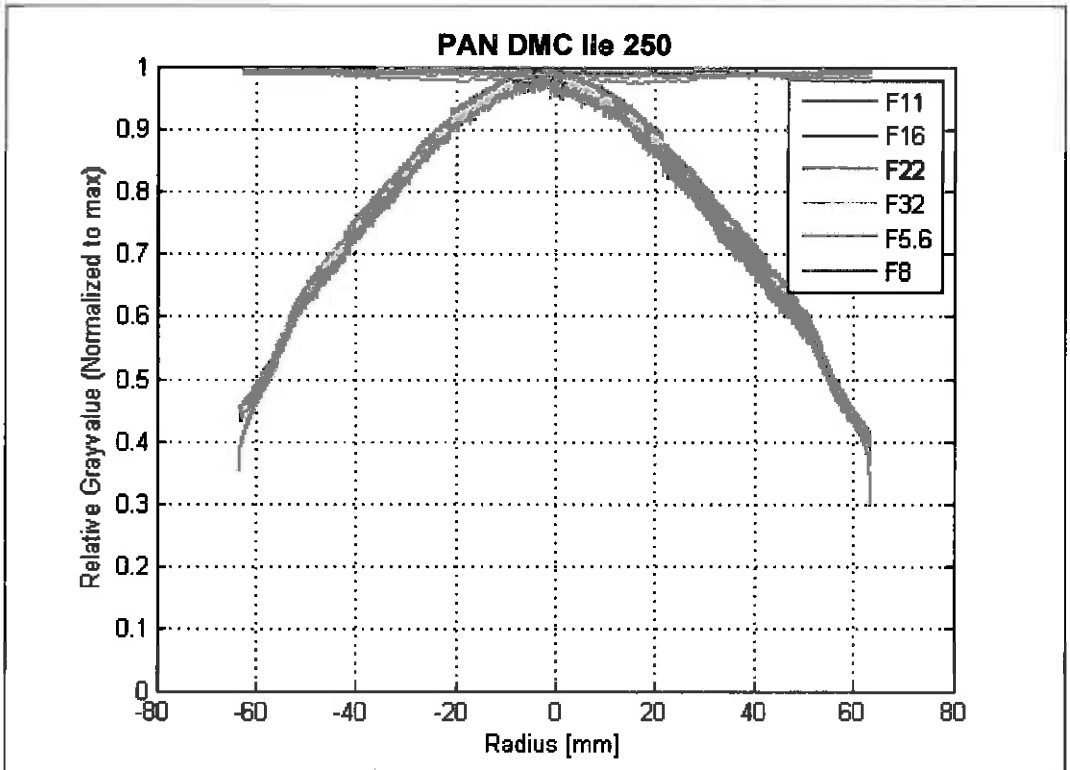
This is from a camera type specific calibration.

Radiometric Calibration

Aperture Correction (Reference)

Camera PAN (00121780)

The light fall off to the border due the influence of the optics depends on the aperture used. Therefore this calibration approach delivers individual calibration images for each aperture (Full F-Stop). In general the light fall off is a function of the image height (radial distance from center). The figure below shows the profile from the upper left corner to the lower right corner of the calibration images. Compensation of the light fall off can be measured after normalization and is within ± 2.5% of the dynamic range.



Light fall off and correction after normalization (blue) for PAN sensor

This is from a camera type specific calibration.

Radiometric Calibration

Defect Pixel

Camera PAN (00121780)

Defect pixels are detected during radiometric calibration and will be corrected during radiometric processing of the images. The quantity and cumulative percentage and specification of defects is described in Appendix "Defect Pixel Recognition".

Revision of calibration:	131073
CCDRevision:	1
Date Number:	1412090612
Date:	140930
Number of defect pixels:	180
Number of defect clusters:	0
Number of defect columns:	3

Nr	Row	Column
0	909	32
1	3098	110
2	3043	123
3	13717	154
4	908	217
5	13582	380
6	13583	380
7	9503	449
8	434	455
9	435	455
10	2897	567
11	2897	568
12	9323	644
13	9324	644
14	9323	645
15	9324	645
16	10175	785
17	697	838
18	779	1151
19	13087	1302
20	10740	1409
21	4284	1610
22	14302	1746
23	955	2074
24	5758	2262
25	5759	2262
26	3209	2426
27	3209	2427
28	1926	2564
29	14397	2919
30	14398	2919
31	14399	2919
32	14397	2920
33	14398	2920
34	14399	2920
35	14397	2921
36	14398	2921
37	14541	3118
38	8416	3535
39	10290	3674
40	11162	3687
41	11162	3688
42	1288	3708
43	1286	3710
44	1288	3711
45	8937	3800

46	9672	3860
47	4413	3865
48	4365	3899
49	344	4050
50	3968	4751
51	3873	4864
52	2573	5786
53	5229	6046
54	5230	6046
55	2012	6631
56	2013	6631
57	2014	6631
58	11546	6647
59	11546	6648
60	11546	6649
61	6269	6654
62	6270	6654
63	7327	6654
64	362	6771
65	4631	6968
66	4634	6968
67	4635	6969
68	4630	6970
69	4635	6970
70	4635	6971
71	4631	6972
72	4633	6973
73	3786	7378
74	11979	7852
75	12428	7876
76	1159	9079
77	1159	9080
78	1160	9080
79	3725	9144
80	21	9275
81	22	9275
82	22	9276
83	23	9276
84	24	9276
85	1818	9689
86	512	9850
87	14	9994
88	7149	10040
89	7151	10042
90	7152	10042
91	7152	10043
92	32	10255
93	33	10255
94	34	10255
95	32	10256
96	33	10256
97	34	10256
98	1902	10284
99	1903	10284
100	11123	10743
101	11125	10743
102	11123	10744
103	11123	10745
104	11125	10745
105	5513	10787
106	2833	11533
107	2831	11534
108	2835	11534
109	2830	11535
110	2831	11535
111	2832	11535
112	2835	11535
113	2830	11536
114	2832	11536
115	2833	11536
116	2834	11536
117	2831	11537
118	2832	11537
119	2833	11537
120	2834	11537
121	2830	11538
122	2832	11538

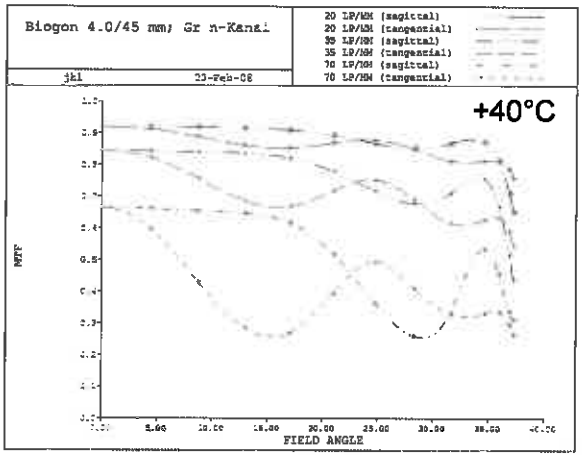
123	2835	11538
124	1975	11570
125	1976	11570
126	1977	11570
127	1976	11571
128	1977	11571
129	1978	11571
130	1976	11572
131	1977	11572
132	1978	11572
133	1976	11573
134	1977	11573
135	1978	11573
136	8826	12453
137	8826	12454
138	8830	12454
139	410	12878
140	1819	13141
141	1818	13142
142	1819	13142
143	9446	13740
144	4286	13754
145	3331	13756
146	3332	13756
147	2509	14121
148	1795	14244
149	5095	14322
150	5096	14322
151	5094	14323
152	5097	14323
153	5096	14325
154	14128	14437
155	3572	14614
156	3572	14615
157	8110	14626
158	8110	14627
159	8110	14628
160	369	15151
161	370	15151
162	371	15151
163	372	15151
164	373	15151
165	373	15152
166	9734	15159
167	7786	15228
168	7376	15966
169	7375	15967
170	7375	15968
171	7377	15968
172	2230	16351
173	2230	16352
174	11610	16409
175	14335	16646
176	3126	16681
177	3127	16681
178	1511	16899
179	6662	16907

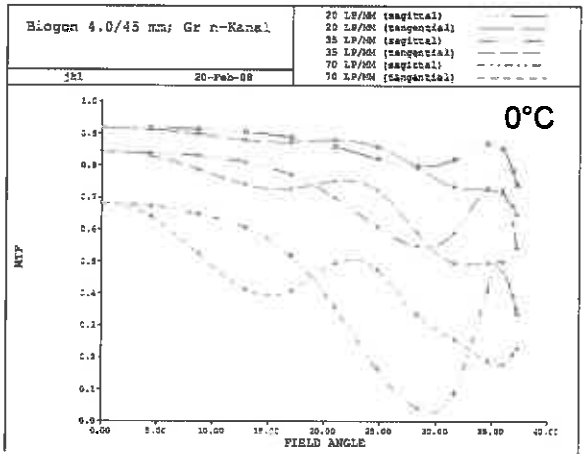
Defect	Column	RowStart	ColumnStart	RowEnd	ColumnEnd
0		0	10768	7328	10768
1		0	12350	7327	12350
2		11091	16887	11105	16887

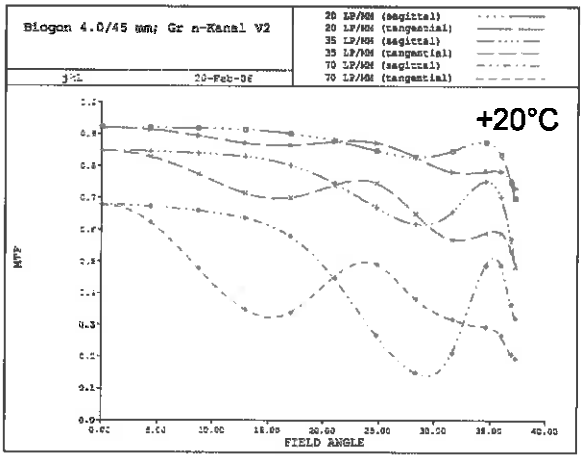
Optical System

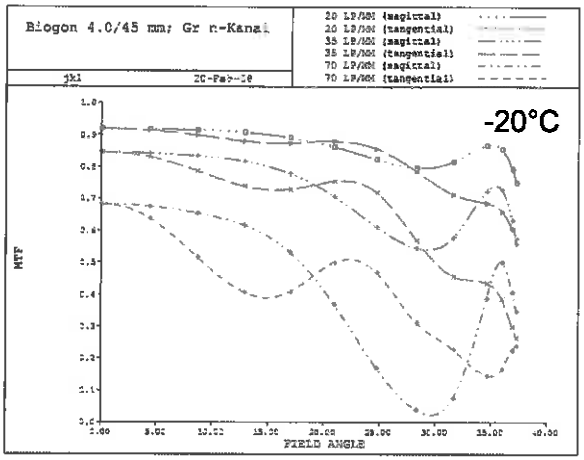
Modulation Transfer Function, MTF of Green camera

RMK D / RMK DX / DMC II MS Green – MTF F/4.0 ; 45 mm– Temperature Stability





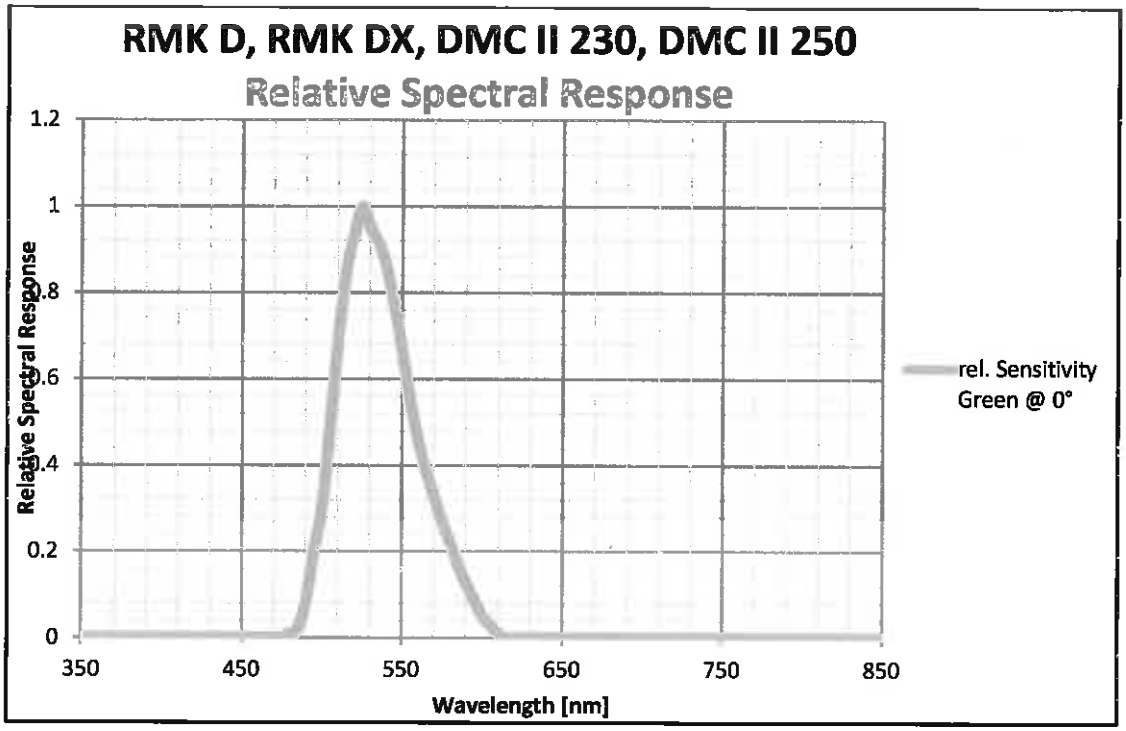




Radiometric Calibration

Sensitivity of Green camera

Spectral response curve of the single camera head.

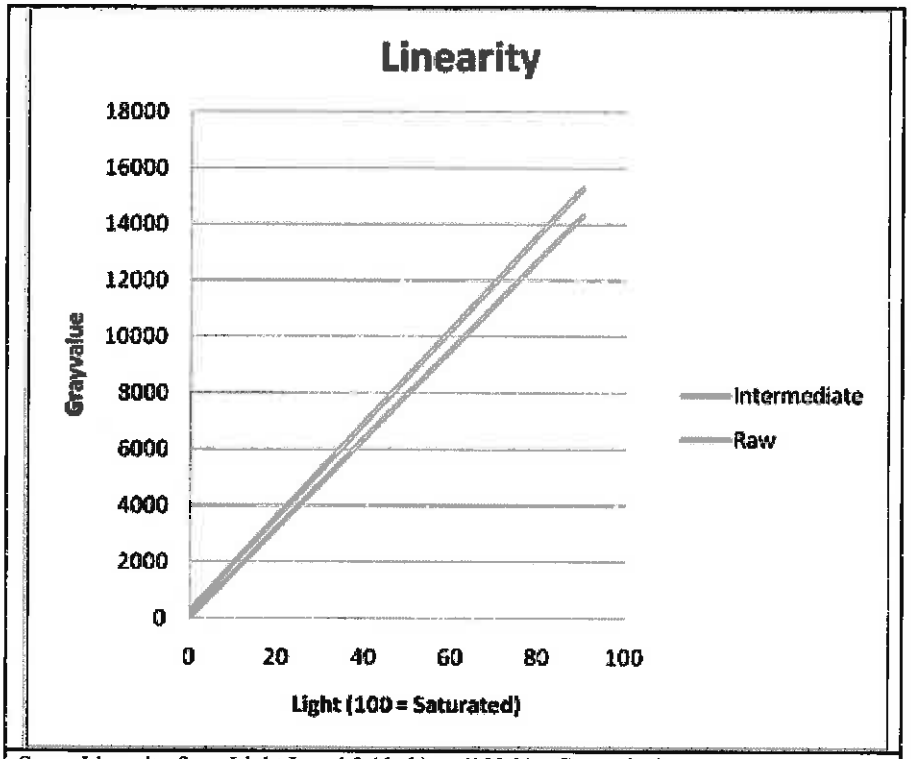


The sensitivity shows the spectral response curve of the single camera head including the optical system (optics, filter) and the sensor response. The DMC IIe 250 is calibrated with respect to the absolute spectrometer. This allows computing pixel radiance values from pixels digital numbers and is a camera type specific calibration.

Radiometric Calibration

Sensor Linearity (Reference)

The sensor linearity is measured in the Lab with calibrated spectrometer. This is a camera type specific calibration.
Below figure shows the linearity of the raw sensor and after flat fielding:



Senor Linearity from Light Level 0 (dark) to (100 % = Saturation)

The deviation from the linearity is below 1%.

Radiometric Calibration

Sensor Noise (Reference)

Sensor noise shows image noise with respect to the image center measured at an aperture of 8 with exposure time of 22msec. Sensor noise after calibration shall be less or equal 0.5% of radiometric resolution. At 14bit radiometric resolution 0.5% (of 16384) is equal to 82 gray values. This is a camera type specific calibration.

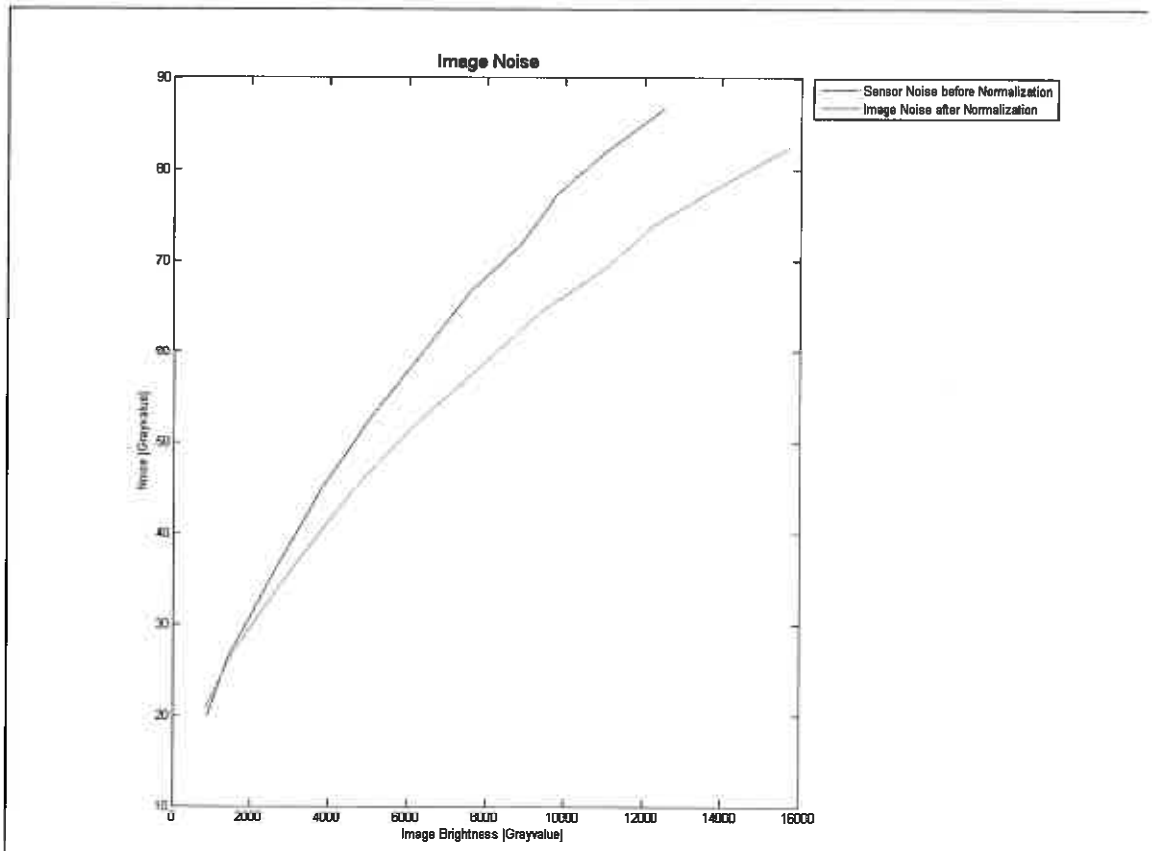


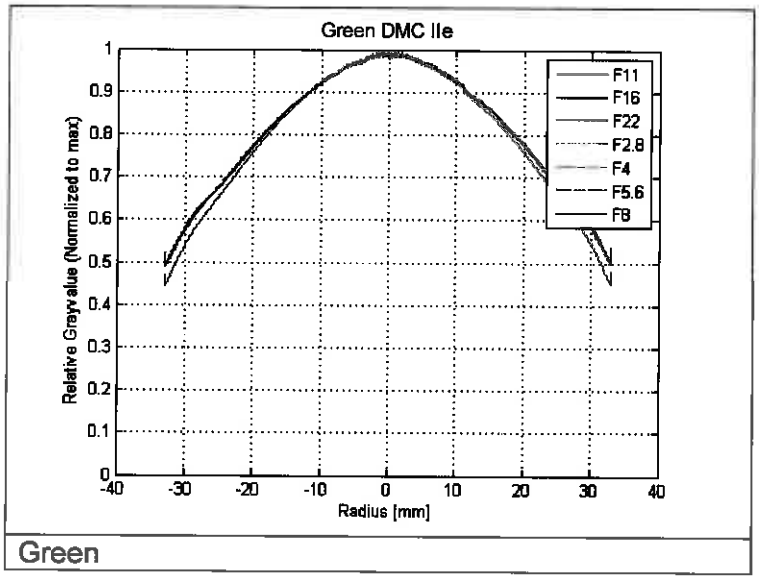
Image Noise before and after radiometric calibration

Radiometric Calibration

Aperture Correction

Green (00124731)

The light fall off to the border due the influence of the optics depends on the aperture used. Therefore this calibration approach delivers individual calibration images for each aperture (Full F-Stop). In general the light fall off is a function of the image height (radial distance from center). The figure below shows the profile from the upper left corner to the lower right corner of the calibration images.



This is a camera type specific calibration.

Radiometric Calibration

Defect Pixel

Green (00124731)

Defect pixels are detected during radiometric calibration and will be corrected during radiometric processing of the images. The quantity and cumulative percentage and specification of defects is described in Appendix "Defect Pixel Recognition".

Revision of calibration:	131073	
CCDRevision:	1	
Date Number:		1410352402
Date:		140910

Number of defect pixels:	5
Number of defect clusters:	0
Number of defect columns:	0

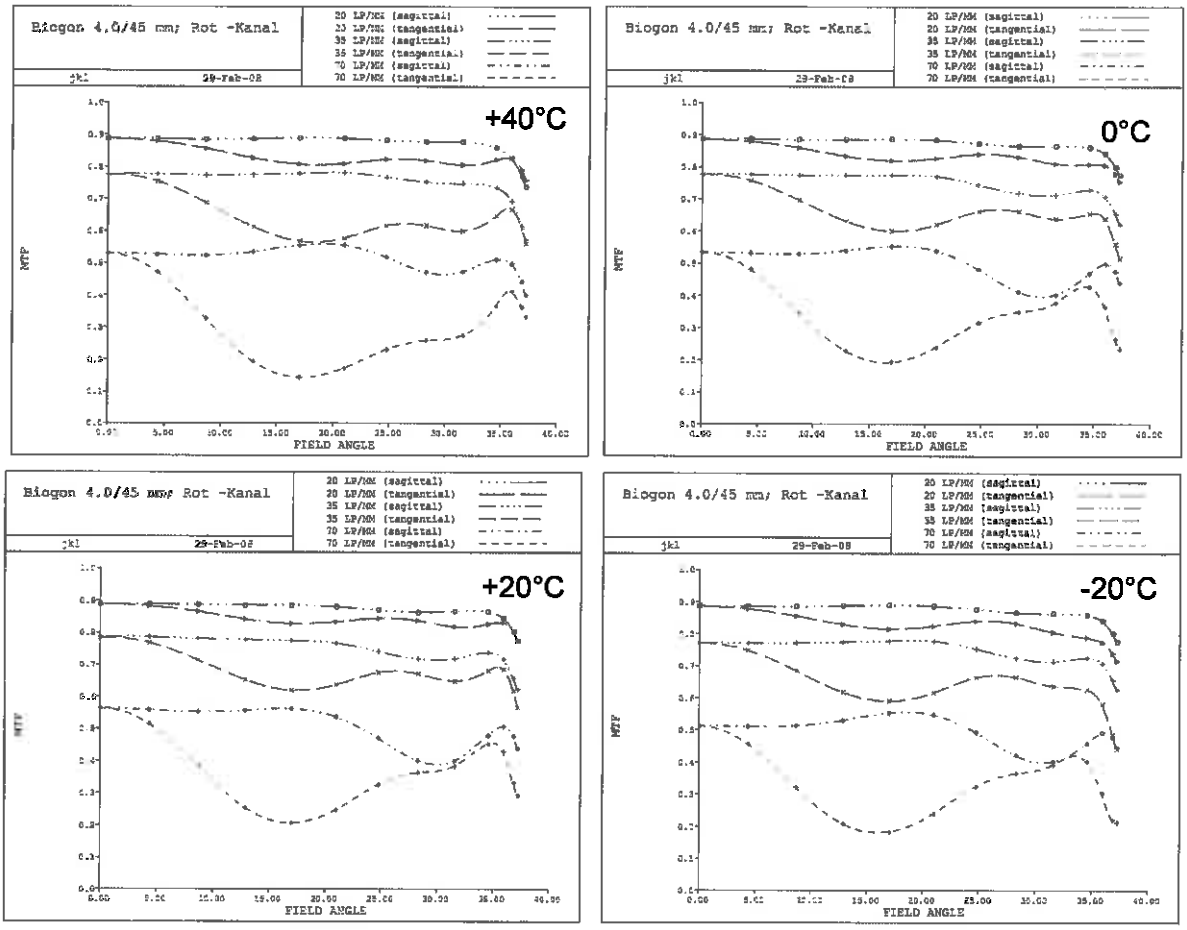
Nr	Row	Column
0	6510	119
1	4970	1551
2	6155	3504
3	6615	3759
4	6543	5641

Defect Column RowStart ColumnStart RowEnd ColumnEnd

Optical System

Modulation Transfer Function, MTF of Red camera

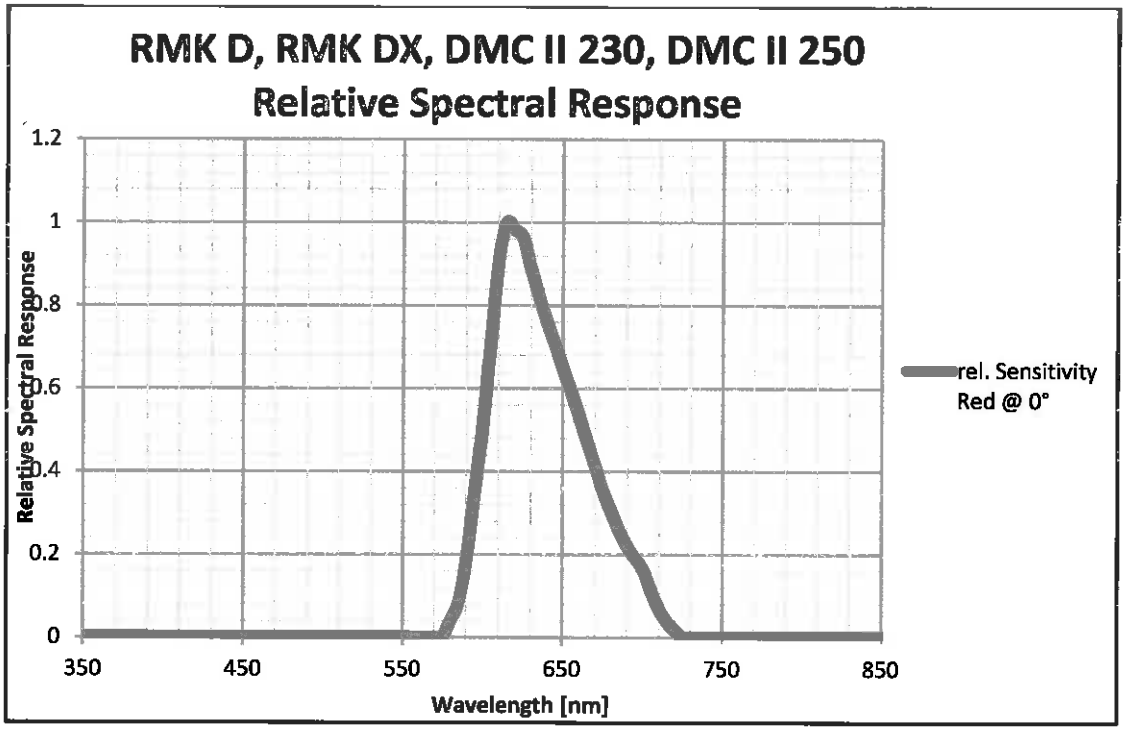
RMK D / RMK DX / DMC II MS Red – MTF F/4.0 ; 45 mm– Temperature Stability



Radiometric Calibration

Sensitivity of Red camera

Spectral Response Curves of the single camera head.

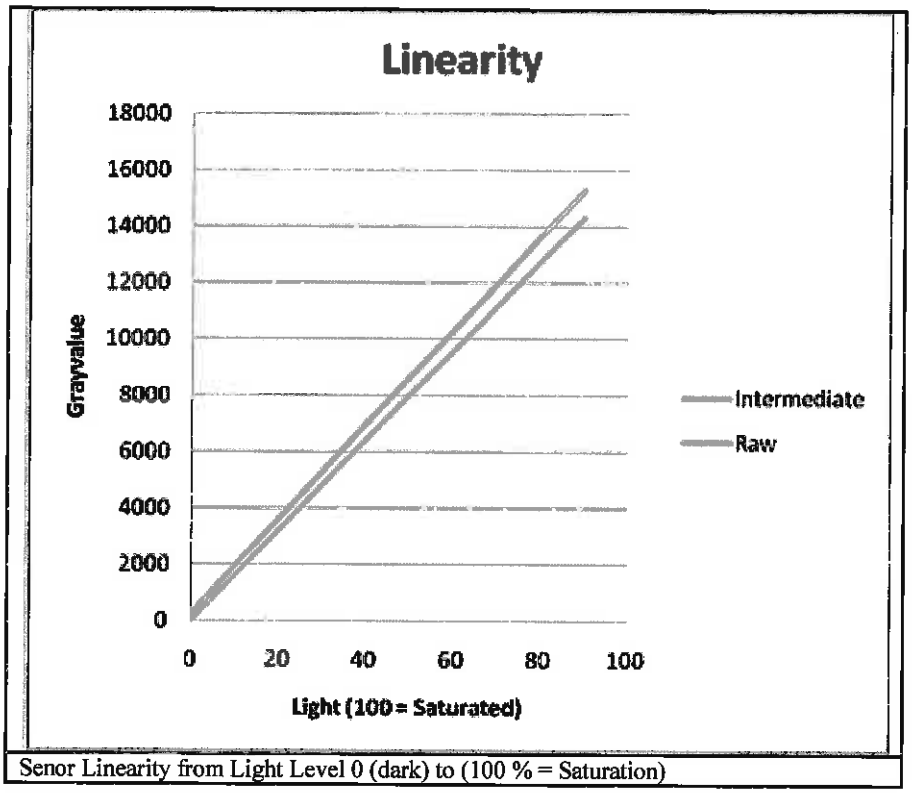


The sensitivity shows the spectral response curve of the single camera head including the optical system (optics, filter) and the sensor response. The DMC IIe 250 is calibrated with respect to the absolute spectrometer. This allows computing pixel radiance values from pixels digital numbers and is a camera type specific calibration.

Radiometric Calibration

Sensor Linearity (Reference)

The sensor linearity is measured in the Lab with calibrated spectrometer. This is a camera type specific calibration.
Below figure shows the linearity of the raw sensor and after flat fielding:



Senor Linearity from Light Level 0 (dark) to (100 % = Saturation)

The deviation from the linearity is below 1%.

Radiometric Calibration

Sensor Noise (Reference)

Sensor noise shows image noise with respect to the image center measured at an aperture of 8 with exposure time of 22msec. Sensor noise after calibration shall be less or equal 0.5% of radiometric resolution. At 14bit radiometric resolution 0.5% (of 16384) is equal to 82 gray values. This is a camera type specific calibration.

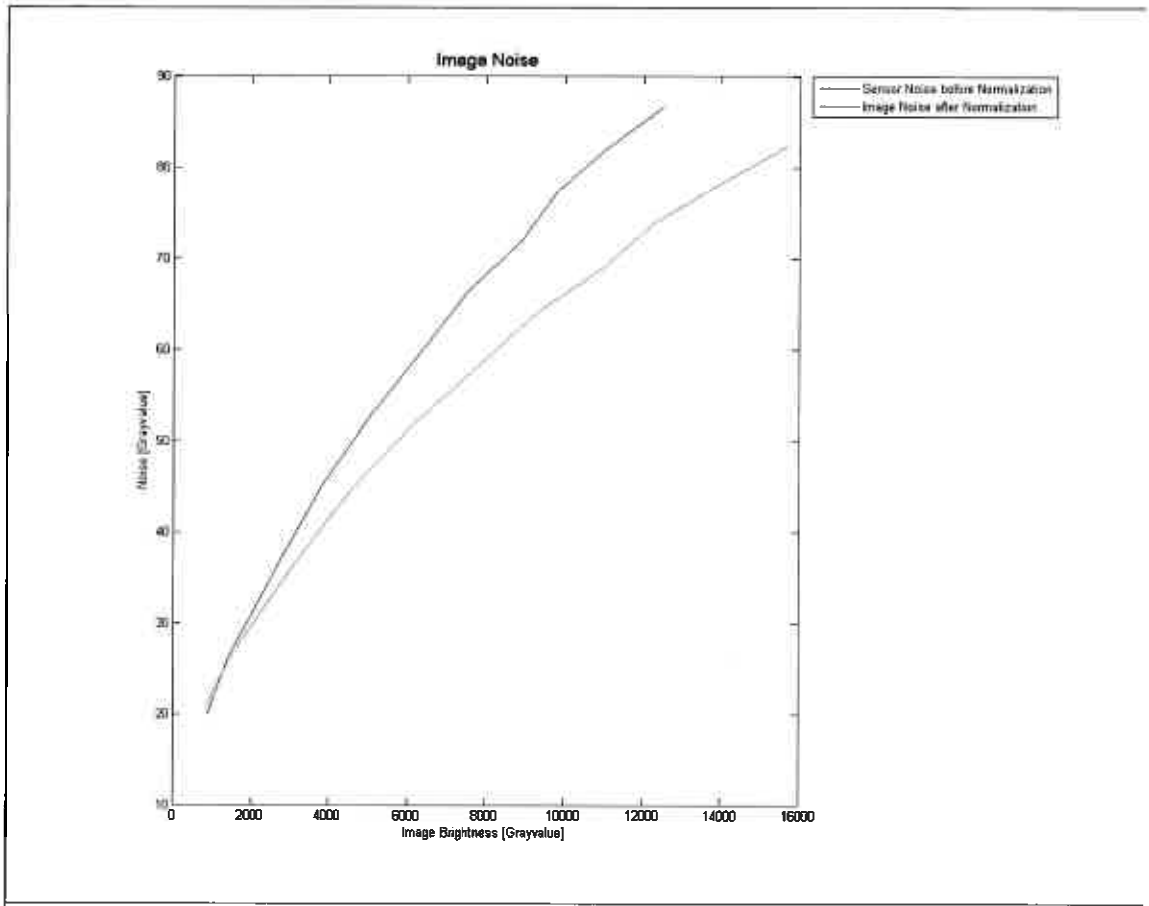


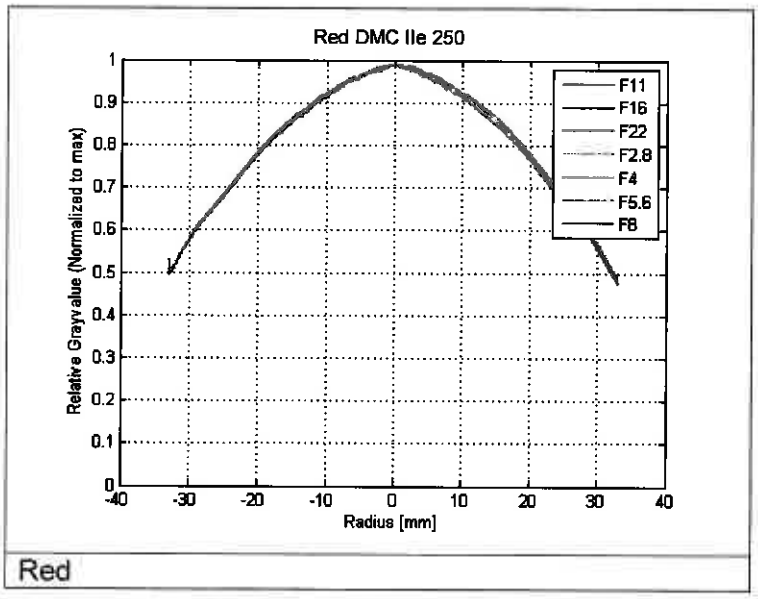
Image Noise before and after radiometric calibration

Radiometric Calibration

Aperture Correction

Red (00124675)

The light fall off to the border due the influence of the optics depends on the used aperture. Therefore this calibration approach has for each aperture (Full F-Stop) its own calibration image. In general the light fall off is a function of the image radius. In this calibration approach instead of function the real measured values in the image is used. The figure below shows the profile from the upper left corner to the lower right corner of each of this calibration images to give a feeling on the amount of correction.



This is a camera type specific calibration.

Radiometric Calibration

Defect Pixel

Red (00124675)

Defect pixels are detected during radiometric calibration and will be corrected during radiometric processing of the images. The quantity and cumulative percentage and specification of defects is described in Appendix "Defect Pixel Recognition".

Revision of calibration: 131073
CCDRevision: 1
Date Number: 1411477244
Date: 140923

Number of defect pixels: 6
Number of defect clusters: 0
Number of defect columns: 2

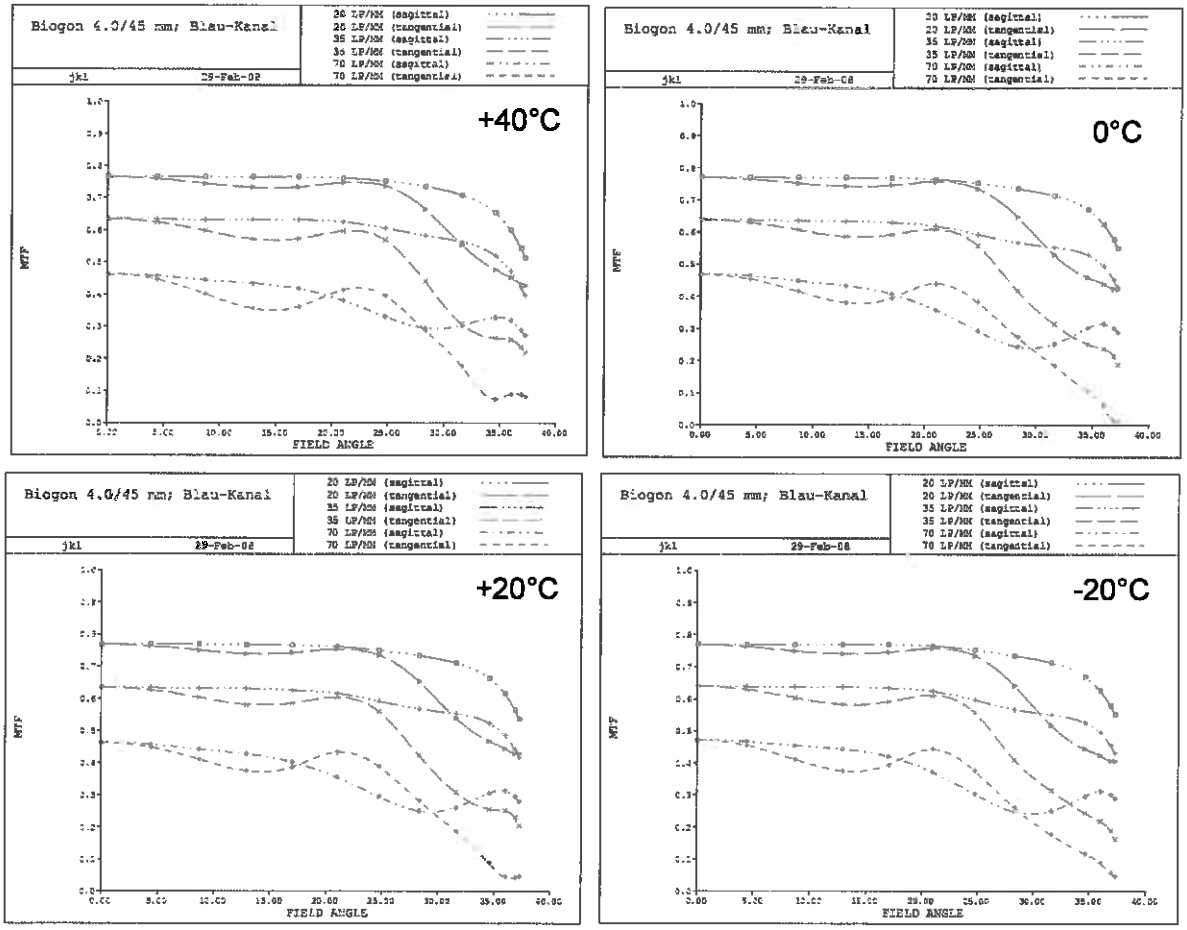
Nr	Row	Column
0	3308	6495
1	3307	3739
2	533	3737
3	5747	6611
4	5744	5748
5	6612	5744

Defect	Column	RowStart	ColumnStart	RowEnd	ColumnEnd
0	6588	5744	6631	5744	
1	6509	4415	6536	4415	

Optical System

Modulation Transfer Function, MTF of Blue camera

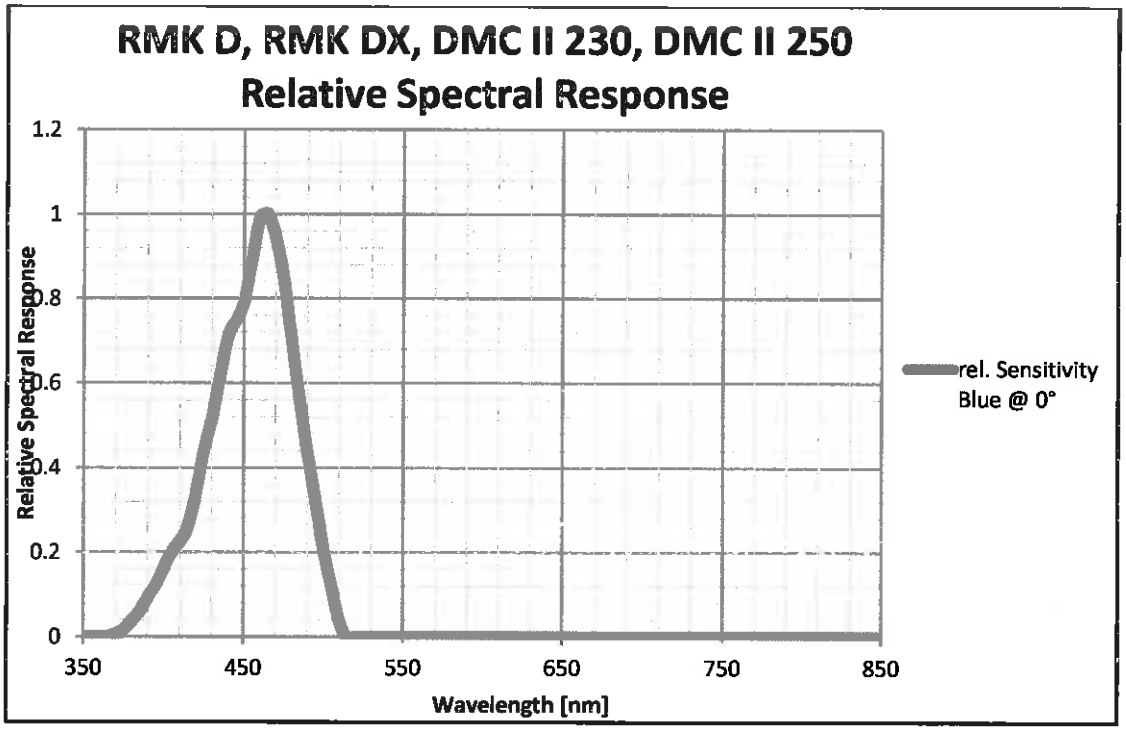
RMK D / RMK DX / DMC II MS Blue – MTF F/4.0 ; 45 mm– Temperature Stability



Radiometric Calibration

Sensitivity of Blue camera

Spectral Response Curves of the single camera head.

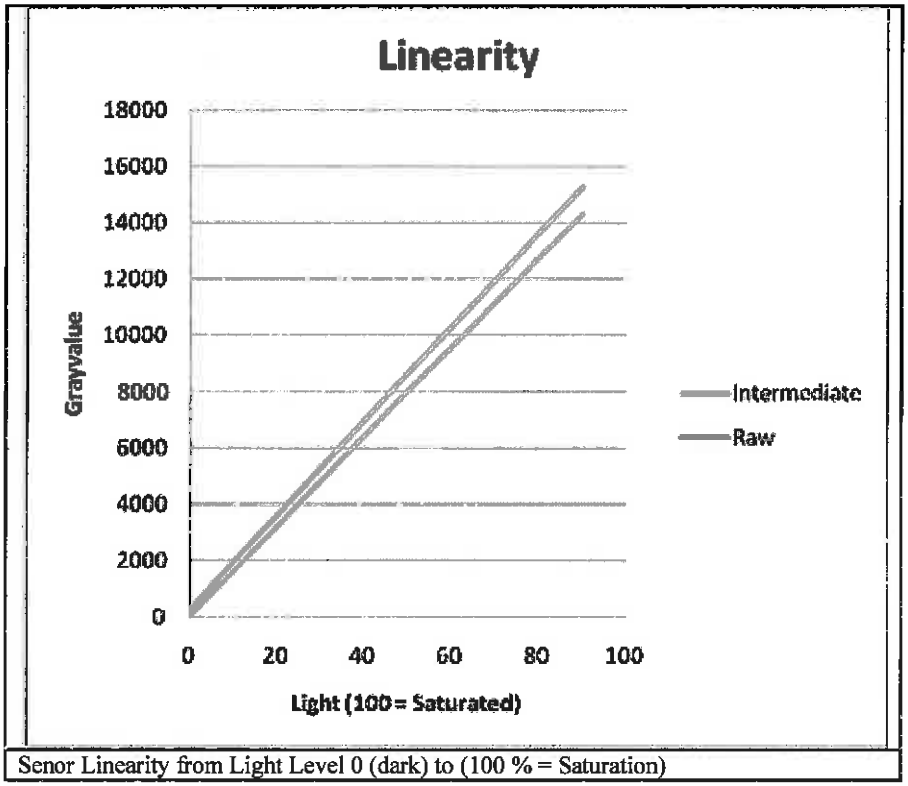


The sensitivity shows the spectral response curve of the single camera head including the optical system (optics, filter) and the sensor response. The DMC IIe 250 is calibrated with respect to the absolute spectrometer. This allows computing pixel radiance values from pixels digital numbers and is a camera type specific calibration.

Radiometric Calibration

Sensor Linearity (Reference)

The sensor linearity is measured in the Lab with calibrated spectrometer. This is a camera type specific calibration.
Below figure shows the linearity of the raw sensor and after flat fielding:



Senor Linearity from Light Level 0 (dark) to (100 % = Saturation)

The deviation from the linearity is below 1%.

Radiometric Calibration

Sensor Noise (Reference)

Sensor noise shows image noise with respect to the image center measured at an aperture of 8 with exposure time of 22msec. Sensor noise after calibration shall be less or equal 0.5% of radiometric resolution. At 14bit radiometric resolution 0.5% (of 16384) is equal to 82 gray values. This is a camera type specific calibration.

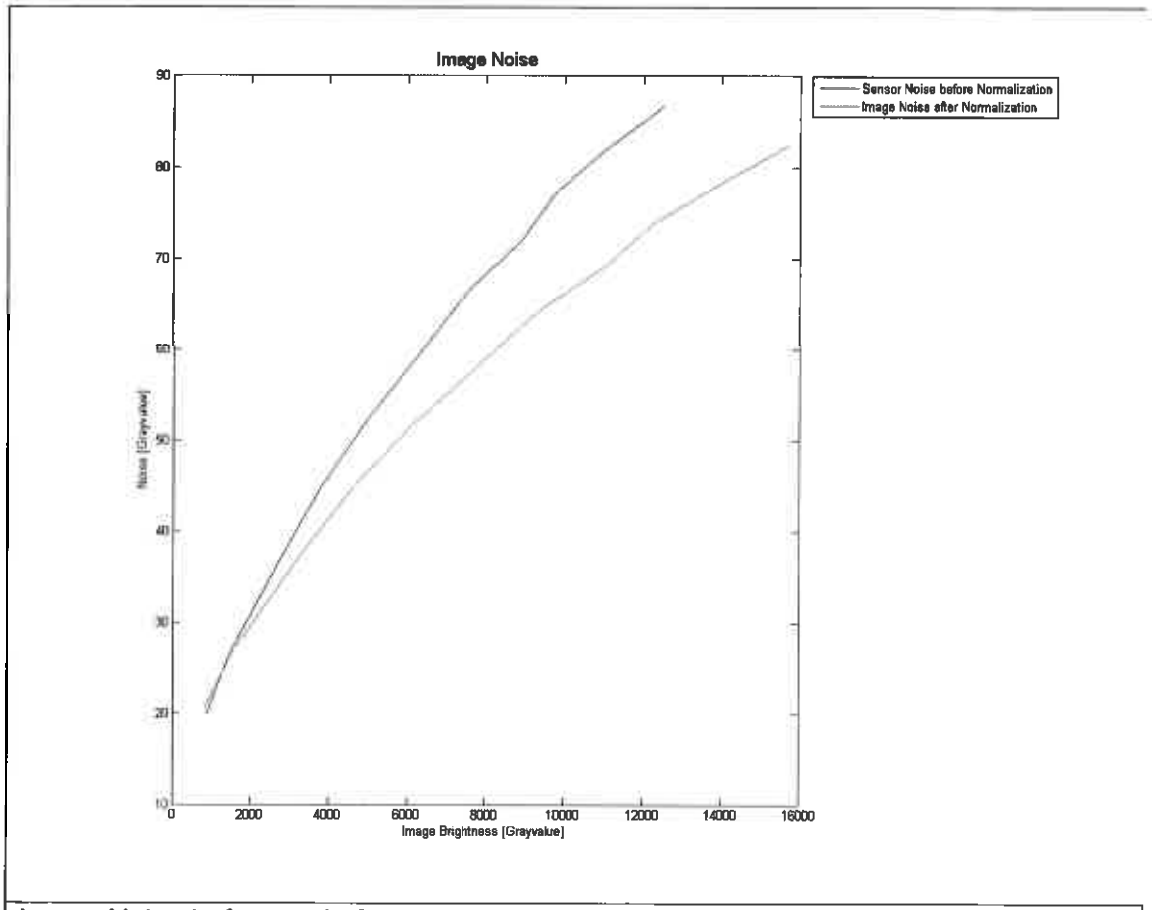


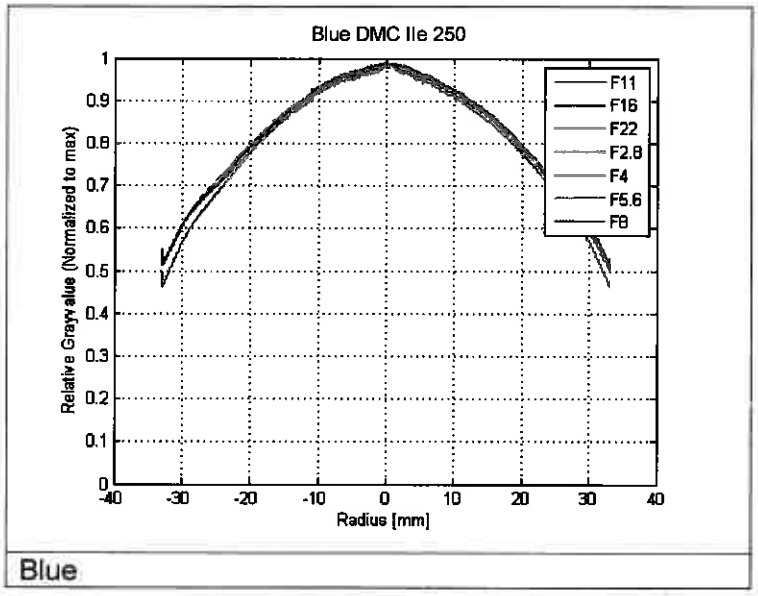
Image Noise before and after radiometric calibration

Radiometric Calibration

Aperture Correction

Blue (00124750)

The light fall off to the border due the influence of the optics depends on the used aperture. Therefore this calibration approach has for each aperture (Full F-Stop) its own calibration image. In general the light fall off is a function of the image radius. In this calibration approach instead of function the real measured values in the image is used. The figure below shows the profile from the upper left corner to the lower right corner of each of this calibration images to give a feeling on the amount of correction.



This is a camera type specific calibration.

Radiometric Calibration

Defect Pixel

Blue (00124750)

Defect pixels are detected during radiometric calibration and will be corrected during radiometric processing of the images. The quantity and cumulative percentage and specification of defects is described in Appendix "Defect Pixel Recognition".

Revision of calibration:	131073	
CCDRevision:	1	
Date Number:		1410278960
Date:		140909
Number of defect pixels:	1	
Number of defect clusters:	0	
Number of defect columns:	0	

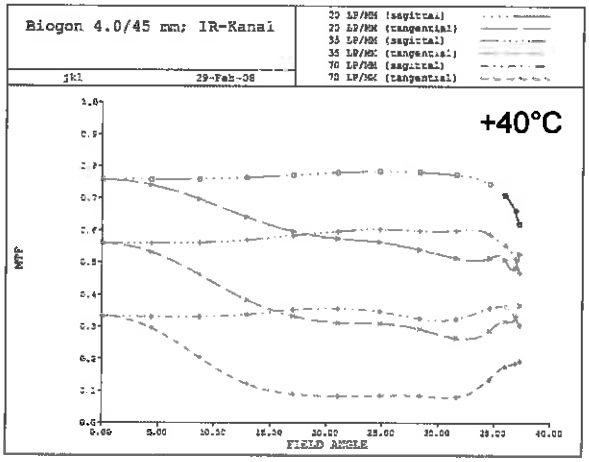
Nr	Row	Column
0	1878	1675

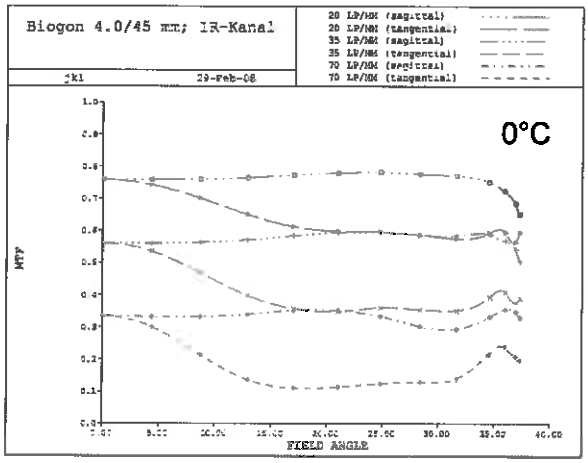
Defect	Column	RowStart	ColumnStart	RowEnd	ColumnEnd

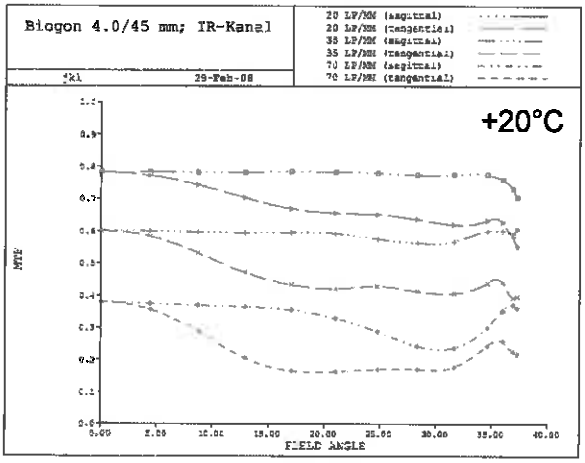
Optical System

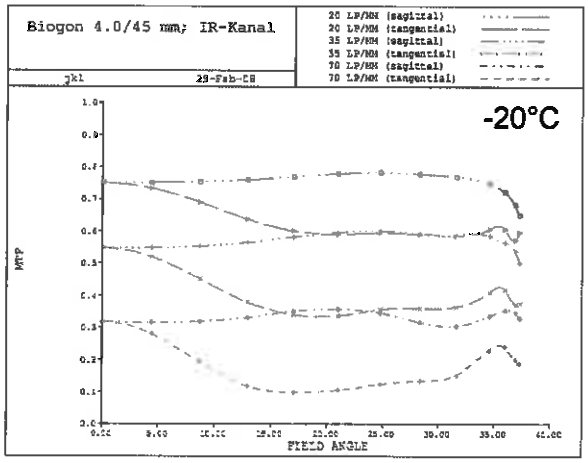
Modulation Transfer Function, MTF of IR camera

RMK D / RMK DX / DMC II MS IR – MTF F/4.0 ; 45 mm– Temperature Stability





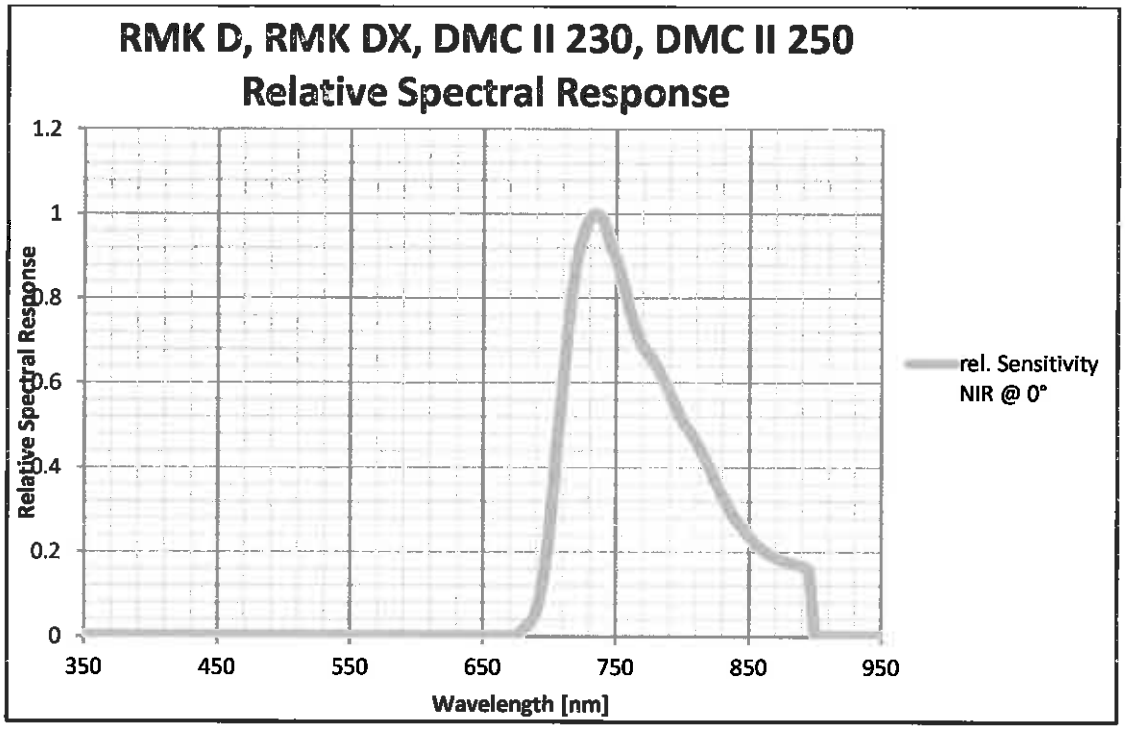




Radiometric Calibration

Sensitivity of NIR camera

Spectral Response Curves of the single camera head.

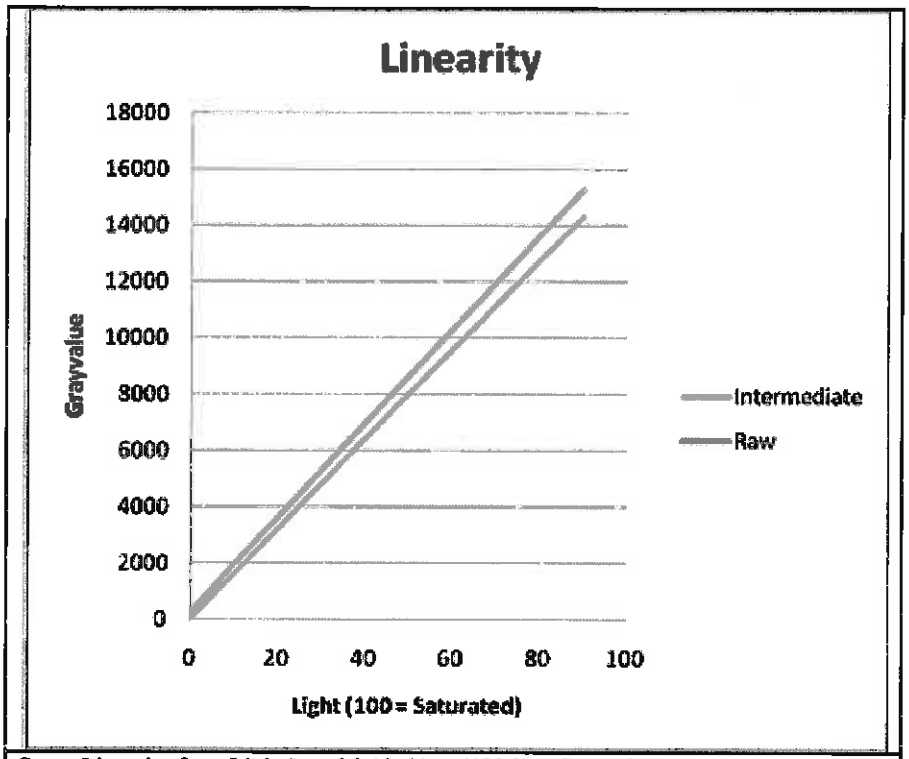


The sensitivity shows the spectral response curve of the single camera head including the optical system (optics, filter) and the sensor response. The DMC IIe 250 is calibrated with respect to the absolute spectrometer. This allows computing pixel radiance values from pixels digital numbers and is a camera type specific calibration.

Radiometric Calibration

Sensor Linearity (Reference)

The sensor linearity is measured in the Lab with calibrated spectrometer. This is a camera type specific calibration.
Below figure shows the linearity of the raw sensor and after flat fielding:



Senor Linearity from Light Level 0 (dark) to (100 % = Saturation)

The deviation from the linearity is below 1%.

Radiometric Calibration

Sensor Noise (Reference)

Sensor noise shows image noise with respect to the image center measured at an aperture of 8 with exposure time of 22msec. Sensor noise after calibration shall be less or equal 0.5% of radiometric resolution. At 14bit radiometric resolution 0.5% (of 16384) is equal to 82 gray values. This is a camera type specific calibration.

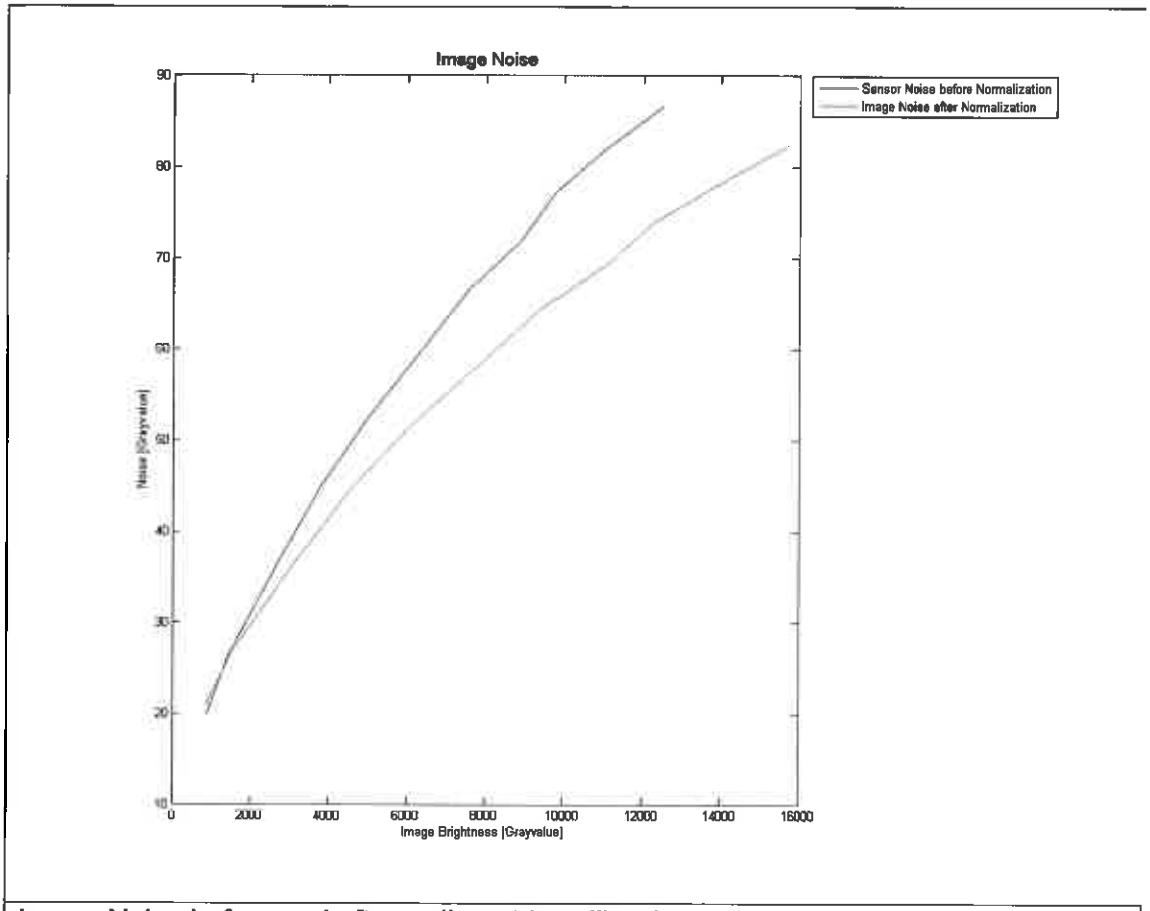


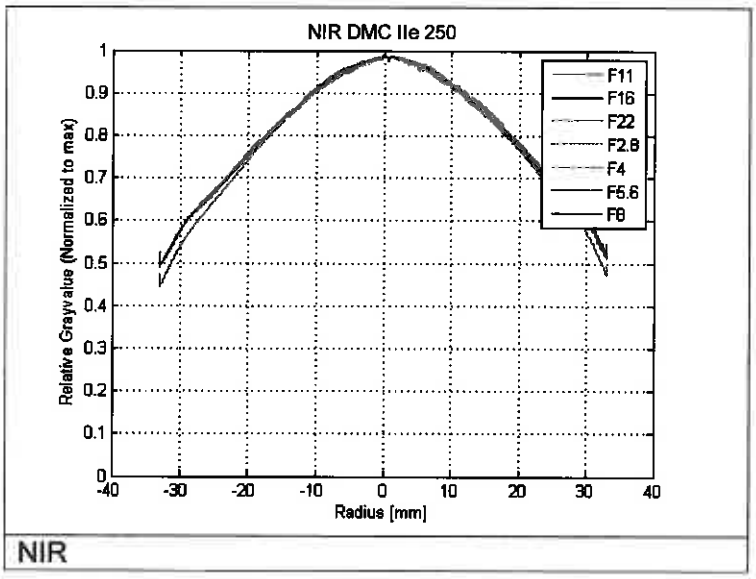
Image Noise before and after radiometric calibration

Radiometric Calibration

Aperture Correction

NIR (00124702)

The light fall off to the border due the influence of the optics depends on the used aperture. Therefore this calibration approach has for each aperture (Full F-Stop) its own calibration image. In general the light fall off is a function of the image radius. In this calibration approach instead of function the real measured values in the image is used. The figure below shows the profile from the upper left corner to the lower right corner of each of this calibration images to give a feeling on the amount of correction.



This is a camera type specific calibration.

Radiometric Calibration

Defect Pixel

NIR (00124702)

Defect pixels are detected during radiometric calibration and will be corrected during radiometric processing of the images. The quantity and cumulative percentage and specification of defects is described in Appendix "Defect Pixel Recognition".

Revision of calibration:	131073	
CCDRevision:	1	
Date Number:		1410279515
Date:		140909
Number of defect pixels:	0	
Number of defect clusters:	0	
Number of defect columns:	0	

Nr	Row	Column

Defect	Column	RowStart	ColumnStart	RowEnd	ColumnEnd

Sensor Geometric Accuracy

Large area CCD imagers are composed (stitched) from several blocks. Stitching on wafer with semiconductor lithographic equipment results in geometric accuracy better than 0.1µm (Stoldt, H. (2010).
Therefore the geometric accuracy of individual pixels within a block can be assumed as better or equal the stitching accuracy.

Defect Pixel Recognition

The table below shows the maximal allowed physical defects on the CCD Sensor and its definitions.

	Description	CCD Spec
Pixel	Bright image	Pixel whose signal, at nominal light (illumination at 50% of the linear range), deviates more than ±30% from its neighboring pixels.
	Dark image	Pixel whose signal, in dark, deviates more than 6mV from its neighboring pixels (about 1% of nominal light).
	Max Count	PAN ≤ 3500 MS <500

	Description	CCD Spec
Column	Definition	A column which has more than 8 pixel defects in 1 1x 12 kernel Column defects must be horizontally separated by 5 columns for single line defects and 10 for double line defects
	Recognition (bright and dark)	Same as defect pixel recognition
	Max Single column	PAN ≤ 140 MS ≤ 20
	Max double Column	PAN ≤ 40 MS ≤ 6

The Post-Processing-Software is correcting following pixel and columns:

	PPS Correction
Pixel	Pixel whose gray value in a 16 x16 kernel differs from the median more than 30%

	PPS Correction
Column	Pixel whose gray value in a 16 x16 kernel differs from the median more than 5% and more than 15 defects in one column

Bibliography

Brown D. C. Close-Range Camera Calibration, Photogrammetric Engineering 37(8) 1971

Dörstel C., Jacobsen K., Stallmann D. (2003): DMC – Photogrammetric accuracy – Calibration aspects and Generation of synthetic DMC images, Eds. M. Baltsavias / A.Grün, Optical 3D Sensor Workshop, Zürich

Fraser C., Digital Camera sel-f calibration. ISPRS Journal of Photogrammetry and Remote Sensing, (997, 5284): 149-159

Zeitler W., Dörstel C., Jacobsen K. (2002): Geometric calibration of the DMC: Method and Results, Proceedings ASPRS, Denver, USA.

Ryan R., Pagnutti M. (2009): Enhanced Absolute and Relative Radiometric Calibration for Digital Aerial Cameras, in: Fritsch D. (Ed.), Photogrammetric Week 2009, Wichmann-Verlag, pp. 81-90.

Doering D., Hildebrand J., Diete N. (2009): Advantages of customized optical design for aerial survey cameras, in: Fritsch D. (Ed.), Photogrammetric Week 2009, Wichmann-Verlag, pp. 69-80.

Stoldt, H. (2010): DALSA Ultra large CCD technology Customized for Aerial Photogrammetry. At: ASPRS 2010, San Diego, USA, p. 15.

OUR TEAM

Resumes attached

SLS has an experienced management team and has the capability of running 4-8 crews on a daily basis, depending on the work load. Through proper quality control management, we strive to deliver a quality product in a timely and cost effective manner. Over the years, our teams have completed projects in all 55 counties in West Virginia.

Gregory A. Smith, P.S. WV License #677

Charles V. "Vic" Moyers, P.S. WV License #849

Jason McVicker, P.S. WV License #2050

Earl Thompson, P.S. WV License #2288

Leslie L. Pierce, P.S. FL License #3757

Matthew J. Hilton Jr., P.S. WV License #2294

Christopher P. Moyers, Project Manager/Party Chief

Ken Simmons, IT/CAD Specialist

D. Brady Stutler, Geotechnical Drilling Manager, CAD/GIS Specialist

GREGORY A. SMITH

President

SMITH LAND SURVEYING, INC.

PROFILE:

Greg formed Smith Land Surveying Company in 1976. He operated the organization and controlled all phases of work undertaken by Smith Land Surveying Co., and Incorporated on April 1st, 1987. Work was originally concentrated in central West Virginia. In 1986, Smith Land Surveying, Inc. began working throughout the state as well as in neighboring states, providing Topographic Mapping, and Construction Services for Contractors, Developers & Design Related Professionals.

EDUCATION / SPECIAL TRAINING:

A.S. Degree in Land Surveying - Glenville State College - 1976
American Congress on Surveying & Mapping, Association of Photogrammetry & Photo Interpretation (1.3 units)
US Geological Survey National Mapping Center Resources & Information
Land Sat Image Interpretation at Purdue University
Bluefield State College Land Surveying Seminar (1.6 units)
Pennsylvania State University Computer & Business Courses (2.1 units 1986), Photogrammetry & Business (2.1 units 1985)
Soil Erosion & Sediment Control Plans (1986)
Spill Prevention Control & Countermeasure Plans
Computer Training at CLM Systems, Tampa, FL.
Auto Cad Training at Putnam County Training Center
Surface Mine Permitting & Regulations (1990) - WV Dept. of Energy
Geographic Information System (1990) - RDA Associates, Maryland
Design & Permitting for Water & Sewer Systems (1991) - WV Dept. of Health
Erosion & Sediment Control (1991) - WV Dept. of Natural Resources
Global Position System - Technical & Use (1991)
Wetlands Evaluation (1991) - EPA, US Army Corps, Fish & Wildlife, & WV DNR
Seminar on State Plane Coordinates & NGS High Precision Network - (1992)
Seminar on GIS Applications & Design Procedures - (1992)
Seminar on Surveying & Mapping Contracts and Procedures - WV DOT (1992)
Workshop on Sediment and Erosion Control - (1992)
Seminar on Boundary Mistakes and Professional Liability (1993)
Seminar on Record Research and Boundary Law (1993)
Seminar on Mine Surveying and Mapping (1993)
Seminar on Field Procedures and Establishing EDM Baselines (1993)
Seminar on Methods used to Bid U.S. Government Contracts (1994)
Seminar on Identification, Use, and Mapping of Utilities and their effect on Real Property (1994)
Seminar on Standards, Ethics, and Professional Courtesy (1995)

Seminar on Boundary Disputes, Conflicts of Evidence, and Unwritten Title Transfers (1995)
Seminar on Internet, Networking, and Windows 3.1 and 3.11 (1996)
Seminar on Understanding and Applying the Technical and Legal Aspects of Retracements (1996)
ABET Training Seminar (1997)
Law Enforcement Program – National Standards Committee - NCEES (1997)
Seminar on Uniform Procedures and Legislative Guidelines – National Standards Committee NCEES (1997)
Lyme Disease Awareness – CCM Hospital (1998)
FEMA Seminar on National Flood Insurance Program (1998)
IRS Tax & Revenue Program for Employee Classification and Audit (1998)
Seminar – Employee Motivation, Conflict Resolution, & Managing Stress (1998)
National Geodetic System – Use and Standards (1998)
Geodetic Control with GPS – NSG Program (1998)
GIS for Surveyors – Concepts, Uses, Future Seminar (1999)
GPS Advancements/ Applications for Mountainous Terrain (1999)
Knud Hermanson – Boundary Litigation, the Surveyor & Court (2000)
Professionalism & Ethics for the Professional Surveyor (2000)
NGS – HARN Statewide Monument Densification Project (2000)
Flood Plane Management/National Flood Insurance Program (2002)
Influencing Public Policy to Meet the Needs of the Surveying Profession (2002)
Boundary Law and Legal Aspects of Surveying (2002)
Risk of Doing Business Liability & Regulatory Compliance (2003)
Knud Hermanson – Minimum Standards for Boundary Surveys (2003)
Charm School for Surveyors – Public & Client Relations (2004)
WVSPS Floodplain Management (2006)
Knud Hermanson – Minimum Standards & Ethics (2007)
Surveyor's Use of Historical Maps (2007)
NCEES Meeting – Expanding the Scope of Surveying Practice (2007)

AWARDS / RECOGNITION:

Eagle Scout – 1972
Licensed Professional Surveyor [redacted] – May 1978
Director for WVALS - 1984-1989
1987 West Virginia Surveyor of the Year
Legislative Chairman for State Surveyors Association - 1987-Present
Exam Evaluation Committee for NCEE 1988-1989
President Elect WVALS 1989 - President 1990-1991
President's Award WVALS 1991
Glenville State College Advisory Board – Land Surveying
Glenville State College Advisory Board – Environmental Technology
Featured in WV Community College Association's 1995 Success Stories
Calhoun – Gilmer Career Center Advisory Board – CAD and Drafting Program
1995 Service to Education Award – Gilmer County Board of Education
Appointed by the Governor of the State of West Virginia to the West Virginia State Board of Examiners of Land Surveyors – 1996, 1999 & 2004 – Current Chairman
State Delegate - NCEES 1997, 1998, 1999, 2000, 2003, 2005-2008
First Place National Map Award for Subdivisions American Congress Surveying & Mapping-2002
Third Place NSPS Plat Design Competition for Boundary & Cadastral Maps-2002
Gilmer County Business of the Year-2003
First Place Mapping Award from the American Congress on Surveying & Mapping-2006

PROFESSIONAL ORGANIZATIONS:

Director for WVALS (1984-1989)
Legislative Chairman for State Surveyors Association (1987-present)
Exam Evaluation Committee for NCEE (1988-1989)
President Elect WVALS (1989 – President 1990 – 1991)
Glenville State College Advisory Board – Land Surveying
Glenville State College Advisory Board – Environmental Technology
Glenville State College Advisory Board – Natural Resources Management
Glenville State College Advisory Board – Landman Program (2002 & 2006)
Calhoun-Gilmer Career Center Advisory Board – CAD and Drafting Program
West Virginia Association of Land Surveyors
American Congress on Surveying & Mapping
Pennsylvania Society of Land Surveyors
WV Independent Oil and Gas Association (IOGA)
National Society of Professional Surveyors
Gilmer County Industrial Development Association
WV Society of Architects – Affiliate Member
National Society of Wetland Scientists
WV Oil & Gas Association
Little Kanawha Parkway Authority
American Association of Petroleum Landmen
State Democratic Executive Committee
Democratic Co-Chair for Gilmer County (2006-Present)
Presenter for the WV Auditor's Office – Seminar on Recordation Laws (2006)
Member – Gilmer County Utility Board
IOGA Board Member

CHARLES V. "VIC" MOYERS

Senior Surveyor

SMITH LAND SURVEYING, INC.

PROFILE

Mr. Vic Moyers was licensed as West Virginia Professional Surveyor No. 849 in 1988. When starting for SLS in 1988, he already had over eight years' experience in office and field aspects of boundary, oil and gas, and mining surveys. Since then, has worked as Project Surveyor in charge of supervision of surveying oil and gas well locations, pipeline surveys, boundary surveys, control surveys, highway (route) surveys including centerline, cross-section and profile work with all related computations and calculations. Vic's experience includes supervision and planning of GPS projects as well as processing GPS record research, as-built surveys, topographic mapping, strip mine pit and stockpile volumes, field reconnaissance, instrument man, office calculations & drafting. He has managed several large surveying/mapping projects such as Coal Company purchase of 30+ parcels totaling over 1500 Acres, government purchase/acquisition of over 200 parcels of land for construction and flood easements for the North Fork of Hughes River Dam Project, several miles of four land highway control, stake-out and property acquisition, GPS control surveys for aerial photo mapping projects for commercial development projects, many miles of gas pipeline surveys for construction and permitting. He also supervised all preliminary boundary surveying and topographic mapping for the Federal Prison site in Preston County, West Virginia and normal supervises the surveying of numerous oil and gas related surveys each year and several property surveys. His experience also includes boundary disputes and has served as an expert witness in court proceedings in disputes and property acquisition/condemnations.

FORMAL EDUCATION

Associate in Science in Land Surveying Degree –Glenville State College (1979)

CONTINUING EDUCATION COURSES & SEMINARS

Seminar on Legal Research and Liability (1987)
Seminar on Boundary Law in West Virginia (1990)
Surface Mining Permitting and Regulations – WV Dept. of Energy (1990)
Geographic Information System – RDA Associates, MD (1990)
Geographic Information System—RDA Associates, MD (1990)
Design and Permitting of Water and Sewer Systems—WV Dept. of Health (1990)
Global Positioning Systems—Technical and Use (1991)
Wetlands Evaluation—EPA US Army Corps, Fish and Wildlife & the D.N.R. (1991)
Continuing Education Training Institute Course in NCEE—0.35 Units—GSC (1992) Seminar on Office Procedures Relating to Forms & Sources of Liability, Communication Documentation, Seals & Signatures—Knud Hermansen, P.S. & P.E. (1992)
Seminar on Field to Office Automation (1992)
Seminar on Oil and Gas Laws and Practices of West Virginia—WV D.E.P. (1992)
Workshop on Sediment and Erosion Control (1992)
Professional Liability Seminar—CNA Group (1993)

Seminar on Managing Multiple Project Objectives and Deadlines
Seminar on Differential GPS: Technology and Application (1994)
Seminar on Minimum Standards of Surveying (1995)
Seminar on Ethics and Professional Courtesy (1995)
Seminar on Boundary Lines and Boundary Disputes (1995)
Seminar on Environmental Issues (1996)
Seminar on AshTech Real-time Surveying System (1997)
Seminar on an Introduction to the Internet (1997)
Seminar on a History of the Surveying Profession (1997)
Seminar on Understanding & Applying Technical & Legal Aspects of Retracements (1997)
Micro Station In Roads Software Training—WV DOT (1999)
Surv CADD Advanced Training (1999)
Surv CADD Cogo & Fundamentals (1999)
SMI Construction 5 Data Collection (1999)
Boundary Litigation and the Land Surveyor (2000)
Surveying Practice—Management, Liability, Ethics & Courtesy (2000)
WV Board of Examiners Test Development Workshop (2000)
Seminar on Responsible Charge (2001)
Seminar on Practical GPS Surveying (2001)
Seminar on Surveying Firm in the 21st Century (2001)
WV Board of Examiners Test Development Workshop (2001)
Seminar on Surveying Profession & Public Policy (2002)
WV Board of Examiners Test Development Workshop (2003)
Seminar on Using Coordinates for GPS (2004)
Seminar on Professional/Personal Courtesy "Charm School" (2004)
Seminar on Surveying Evidence "To Accept or Not" (2004)
Seminar on Situational Ethics for Surveyors (2004)
Seminar on Helping Clients Cut Cost of Flood Insurance (2005)
Seminar on Basic Mechanical Lien Application & Judicial Enforcement Procedure (2005)
Seminar on Adjoiner Relations for Surveyors (2005)
Seminar on Minimum Standards for Surveyors (2005)
Seminar on Intro to GIS for Surveyors (2005)
Seminar on Foundation Concepts in GIS for Surveyors (2005)
Seminar on NCEES Surveying Exam Standard Setting Study Workshop
(Invitation Only 2005)
Seminar on Legal Research Basics for Land Surveyors (2006)
Seminar on Disputes between Adjoining Land Owners (2006)
Seminar on Floodplain Development Technical Guide (2006)
Seminar on Public Speaking (2008)
Seminar on Record Research (2008
Seminar on the Effect of Easements on Surveyors' Work (2008)
Seminar on Minimum Standards and Professional Ethics (2008)
Online Continuing Education Course on Time Management Tips for Busy Professionals (2010)
Online Continuing Education Course on Three Secrets of the One Minute Manager (2010)
Seminar on The Advancement of Surveying Instrument Technology and How it Affects You (2010)
Seminar on New Developments in OPUS (2011)
Seminar on Comparative Ethics for Surveyors (2012)
Seminar on Minimum Standards for Surveyors (2012)
Seminar on Surveying Issues in Ohio: Attorney General's Office (2013)

Seminar on Ohio's Underground Damage Prevention Legislative Update (2013)
Seminar on Ohio's Oil and Gas Survey Plat Requirements (2013)

PROFESSIONAL ORGANIZATIONS

Former National Exam Evaluation Committee for NCEES—Invitation Only (1992 & 2005)
Former Member and Chapter Representative for Central Chapter of WVALS
Former WV Association of Land Surveyors (Now WVSPS) Board of Directors Member, Vice President & President
Current Member of Professional Land Surveyors of Ohio (PLSO)

P.O. Box 150, 12 Vanhorn Drive, Glenville, WV 26351
T: (304)-462-5634 F: (304)-462-5656

56065 Dilles Bottom Road, Shadyside, OH 43947
T: (740)-671-9911

JASON McVICKER

SURVEY MANAGER

SMITH LAND SURVEYING, INC.

WORK HISTORY

2014-Present — Smith Land Surveying, Inc., Glenville, West Virginia
Survey Manager
Schedule and supervise 8 field crews, supervise office personnel performing data reduction of field data, plat work, and deed research; client meetings and client development, oversee vehicle and equipment maintenance.

2012-2014 — Blue Mountain Engineering, Wadestown, West Virginia
Field Supervisor and Crew Chief
Schedule and supervise 2-5 field crews, on well pad and pipeline survey work as well as title mapping work. Supervise 3+ office personnel performing data reduction of field data, plat work, and deed research, client project manager for gas client, client meetings.

2012 — Herbert, Rowland & Grubic, Inc., Morgantown, West Virginia
Survey Project Manager
Schedule and supervise 2-5 field crews, supervise 3+ office personnel performing data reduction of field data, plat work, and deed research, client project manager for gas client, field reviews for new gas well pad sites, construction management, client meetings, and help to supervise construction management staff, oversee vehicle and equipment maintenance.

2011-2012 — Triad Engineering, Inc., Morgantown, West Virginia
Survey Supervisor
Management of GPS field operations and equipment, training of staff on GPS field operations and equipment, and field equipment purchasing. Management of coal and oil & gas survey work, job estimates and bids, billing review and over-site, project management for a variety of survey projects ranging from small to large, including rural and residential boundary surveys, topographic surveys, aerial flight control, control surveys, surface mine related surveys, construction stakeout on jobs varying from roadways and site work to concrete and steel work, and Railroad surveys for construction.

2000-2011 — Greenway Engineering, Inc., Winchester, Virginia
Project Manager (2003-2011)
Management of up to 6 office staff, job estimates and bids, project management for a variety of survey projects ranging from small to large, including rural and residential boundary surveys, topographic surveys, aerial flight control, control surveys, surface mine related surveys, construction stakeout on jobs varying from roadways and site work to concrete and steel work, Oil and Gas related surveys including: the

staking of gas wells, topography for gas well pads, ponds, and roads, pipeline surveys, lease unit boundary surveys of up to 2000 acres each.
Partial management of a sister office (2009 & 2010) with duties including: scheduling of up to 6 field crews, management of up to 8 office staff, over site of employee timesheets, pricing of potential new jobs, negotiation of past due bills with clients, vehicle maintenance coordination, over site of survey equipment maintenance and repair, reviewing bills, and reviewing work performed by staff.

Field Coordinator (2000-2003)
Order and distribute field supplies, management of up to 4 office staff and up to five 2-man field crews, company vehicle management, job estimates and bids, project management, field data entry, computer drafting, survey computations to include boundary related (calculating surveys as to where property corners are to be set, traverse computations, deed delineation, and deed research), and construction related (calculating stockpile volumes, yardage moved volumes, calculating survey stakeout data from building and site grading plans, and developing as-built drawings of existing structures that are to be moved and re-erected).
Direct rural and residential boundary surveys, topographic surveys, aerial flight control, control surveys, and surface mine related surveys, as well as construction stakeout on jobs varying from roadways and site work to concrete and steel work.

1998-2000 Garbart Consulting Services, Inc., Uniontown, Pennsylvania
Chief Surveyor/Department Manager
Personnel management, company vehicle management, order and distribute supplies and equipment, job estimates and bids, project management, field data entry, computer drafting, and survey computations to include boundary related (calculating surveys as to where property corners are to be set, traverse computations, deed delineation, and deed research), and construction related (calculating stockpile volumes, yardage moved volumes, calculating survey stakeout data from building and site grading plans, and developing as-built drawings of existing structures that are to be moved and re-erected).
Direct and perform rural and residential boundary surveys, topographic, aerial flight control, control surveys, underground and surface mine related surveys, as well as construction stakeout on jobs varying from roadways and site work to concrete and steel work

EDUCATION

1993-1995 College of Civil Engineering, West Virginia University
1989-1991 Associate Degree- Land Surveying Technology, Glenville State College

COMPUTER SKILLS

- AutoCAD / SurvCADD software use from 1992 to present
- Microsoft Word use from 1995 to present
- HP 48 handheld /SMI software use from 1993 to present Carlson data collector with Carlson SurvCE Software as a total station data collector, RTK data collector and Static GPS data collector

- Familiarity with several models of field instruments including Topcon, Sokkia, Nikon, Leica, and Wild, as well as some data collection models.

MEMBERSHIPS, LICENSES, CERTIFICATES

- State of West Virginia Professional Surveyor License [redacted] (Obtained in 2001)
- Member of the West Virginia Society of Professional Surveyors
- CSX Railroad Training and Certification
- 24 hours MSHA Surface Mine Coal and Construction Safety Certification
- 24 hours MSHA training towards 40 hr Underground Miner Certification
- OSHA 10 Hour Certification
- Safeland Certification

EARL THOMPSON

PROJECT MANAGER

SMITH LAND SURVEYING, INC.

EXPERIENCE

- Has experience in hand drafting and entries of field notes.
- Experienced on the operating systems of Carlson Software and several versions of Auto-CAD systems.
- Has experience in the operation of data collection devices and on site calculations and decisions.
- Has worked as a Project Surveyor in charge of surveying oil and gas well locations, and boundary and partition surveys.
- Experienced with pipeline profiles for both road and stream crossings, GPS data processing, construction stake-outs, courthouse research, topographic surveys and mapping, field reconnaissance, all positions on field crews, and drafting. Has been in charge of several projects for EQT including both office and field sides.
- Experienced with controlling multiple crews simultaneously and public relations and with designing multiple well pad locations and spacing plans of horizontal well paths.
- Has been in charge of and overseen the operation and checking of levels which was performed for a coal company consisting of approximately 1.5 miles located in Wyoming County, WV. And was in charge of the stake-out for tower bases and most of the As-Builts for this project as well.
- Marked many miles of seismic lines using long-hand calculations on site in Southern Kentucky.
- Several years of experience as an over-the-road truck driver, mechanics on tractor trailers and many military vehicles and associated components.
- Experienced with the operation and mechanics of several different pieces of heavy equipment such as bulldozers, track hoes, backhoes, and fork lifts.

EDUCATION & ACHIEVEMENTS

State of West Virginia Professional Surveyor License [redacted]
Associate of Science in Land Surveying – Glenville State College (1992)
Class A CDL Driver's License (1994)
Fuel Handling Safety Class (2003)
ABS Brake System Class (2003)
Warehouse Safety & Chemical Neutralization Class (2003)
Airborne Hazards Class (2004)

LESLIE PIERCE

PROJECT MANAGER

SMITH LAND SURVEYING, INC.

Professional Experience:

2010-Present Project Surveyor, Smith Land Surveying, Inc.
Responsibilities include Phase1 Environmental Site Assessments, road condition surveys and reports, preparation of permit applications for local, state and federal agencies, research public records, QAC of field and office data, prepare maps and reports for field surveys.

2009-2010 Self Employed Professional Surveyor (Florida)
Provide professional land surveying and related consulting services to private and public clients. Provide boundary, topographic, photogrammetric control, accident surveys, right of way surveys, subdivision platting and hydrographic surveys.

2006-2009 Hillsborough County Florida-Manager of County Survey Field Office
Managed survey field office for Hillsborough County, Florida. Responsibilities included day to day operations of surveying office and personnel, develop budgets, perform and prepare boundary, topographic, environmental surveys. Provide surveys and data to public and private clients. Establishment of continuously operating GPS reference base stations.

1997-2006 Hillsborough County Florida-Manager of County Right of Way Section
Responsible for management of 20 + staff and contract with 21 surveying and mapping consulting firms. Perform quality control for subdivision platting, road right of way surveys, road design plans and photogrammetric mapping. Created inter-local agreements with other government organizations, develop budget, maintain technical hardware and software. Developed countywide right of way inventory program.

1990-1997 Hillsborough County Florida-Professional Surveyor

1986-1990 Delta Engineering Corporation-Chief of Surveying

1968-1986 Delta Engineering Corporation-Professional Surveyor

Licenses:

Professional Surveyor (Florida) [redacted]

Education:

1967	King High School- Tampa, Fl
1698-2012	Continuing educational seminars and training in surveying and business management
2012	Phase 1 ESA Training (ER-Due Diligence at Dawn Seminar)

Professional Organizations:

Member, ACSM- American Congress on Surveying and Mapping
Member, ASPRS- American Society on Photogrammetry and Remote Sensing
Member, National Association of County Surveyors
Member, West Virginia Land Society of Surveyors
Member, Florida Society of Professional Surveyors

MATTHEW J. HILTON JR.

PROJECT MANAGER

SMITH LAND SURVEYING, INC.

WORK HISTORY

2011-Present **Smith Land Surveying, Inc., Glenville, West Virginia**
Project Manager
Monitor the progress of projects under my supervision, check well plats and rec plans, perform boundary surveys and compute corners, prepare for drafting, perform level loops and compute elevations for elevation certificates and Loma surveys

2009-2011 **Allegheny Surveys Inc., Birch River, West Virginia**
Senior Party Chief
Staked gas wells and prepared plats and rec plans for drafting, topo'd coal mine stock piles. Using conventional and survey grade GPS, set control points using survey grade GPS, set control points using survey grade GPS, ran field crews on boundary surveys.

2009-2009 **Pocahontas Coal Company, Beckley, West Virginia**
Survey Helper
Assist in setting spads in high wall for lining up high wall mining equipment, assist in running traverse and set bore hole stake, assist in as-built for access roads and high wall reclamation.

2006-2009 **Allegheny Surveys Inc., Birch River, West Virginia**
Senior Party Chief
Staked gas wells and prepared plats and rec plans for drafting, topo coal mine stock piles using conventional and survey grade GPS, set control points using survey grade GPS, ran field crews on boundary surveys.

2001-2006 **Smith Land Surveying Inc., Glenville, West Virginia**
Field Technician/Party Chief
Assist in staking gas wells and access roads, assist with performing boundary surveys, assist with construction surveys, became party chief and began staking gas wells, laying out access roads and preparing well plats for drafting, ran boundary survey crews and helped with the computation of boundary corners and preparing plats and description for drafting, ran level loops and computed elevations for elevation certificates.

1999-200 **Smith Land Surveying Inc., Glenville, West Virginia**
Assist with the project at hand, which included giving back-sights, head chaining on boundary surveys, assist in staking gas wells.

EDUCATION

Associate in Land Surveying, Glenville State College

SKILLS Total stations (including Topcon Gts series, Leica and Nikon) 3 wire level, survey grade GPS
(RTK units including Epoch 35 and Trimble) as well as Trimble mapping grade units
Carlson Survey, TDS data collection software and SMI data collection software

MEMBERSHIPS, LICENSES, CERTIFICATES

- State of West Virginia Professional Surveyor License [redacted] (obtained 2014)
- OSHA 10 Hour Certification
- Heartsaver First Aid, CPR

CHRISTOPHER P. MOYERS

PROJECT MANAGER/PARTY CHIEF

SMITH LAND SURVEYING, INC.

WORK HISTORY

2002-Present Smith Land Surveying, Inc., Glenville, West Virginia
Project Manager/Party Chief

WORK EXPERIENCE

Surveying
Determine best locations for gas well pads, access roads, storage ponds and gas lines based on gas company requirements and in keeping with state and federal regulations and engineering restrictions; locate lease and surface boundary lines; and use GPS, total stations and other surveying equipment for collection of field data.

Construction
Collect preliminary field data and/or topographical data for proposed site prior to design; stakeout points in field for a designed plan for all aspects such as access roads, well pads, storage ponds, sediment traps, erosion and sediment controls, etc.; complete "As-Built" on finished site to determine grades on constructed slopes, pond volumes, pad sizes, etc.

Mapping
Field work preparation including target formations and offset well spacing, location and pit size, access road options, coal activities, existing pipeline locations for proposed tie-ins, lease boundaries and ROW options; use AutoCADD to plot deeds and lease descriptions and overlay them to topographic maps, oil and gas well spot maps, farmline maps, aerial photos and other drafting; drafting well pad and storage ponds site plans, reclamation plans, pipeline and access road ROWs, public road encroachments/crossing, creek/river crossings and well plats; additional mapping using ARCHVIEW and similar software programs.

Courthouse Research
Locate deeds, lease agreements, ROW agreements and etc. for subject tracts of land; determine ownership of surface and mineral tracts; trace back

particular tracts to determine chain of title and out conveyances; obtain all available relevant information to enable the permitting of an oil and gas well.

Interpersonal
Coordination and correspondence with state officials, client representatives, construction personnel and landowners.

P.O. Box 150, 12 Vanhorn Drive, Glenville, WV 26351
T: (304)-462-5634 F: (304)-462-5656

56065 Dilles Bottom Road, Shadyside, OH 43947
T: (740)-671-9911

KEN SIMMONS

IT/CADD Specialist

SMITH LAND SURVEYING, INC.

EXPERIENCE

IT/CADD Specialist, Smith Land Surveying (2008-current)

Design land features such as ponds, pads and drains using Carlson Civil Software.
Create Topographical data for Quantities for cut and fill.
Created and continue to update written job descriptions for office personnel.
Developed manual for all business office procedures, resulting in standardized operations.
Well Plats, Permits, and Exhibits.
Design of Site Plans for Marcellus Shale Gas Wells.
Take care of all computer and network issues.

Office Supervisor, Thrasher Engineering (2004-2008)

Design land features such as ponds, pads and drains using Civil Land Desktop.
Create Topographical data for Quantities for cut and fill.
Deed research and right-of-way information for P.S.D. related jobs and work done for Eastern Coal.
Created and continue to update written job descriptions for office personnel.
Developed manual for all business office procedures, resulting in standardized operations.
Worked primarily for pipeline, pipeyard and test stations for four years.

Office Manager, Wheeler, Jackson and Ferrell, Inc. (2004)
Performed business office duties.
Field work as instrument man as well as court research.
Survey plats using Eagle Point software.
Ordered office and survey supplies.

Cadd Tech. Smith Land Surveying (2001-2004)

Survey and Well Plats using Carlson Software.
Field Work as a rod man

Cadd Tech. & Field Crew, D. L. Wheeler and Associates (1991-2001)

Survey, Mortgage and Alta plats using Auto Cadd and Eagle Point software.
Field work as a rod man and as instrument man.

D. BRADY STUTLER

Geotechnical Drilling Manager/CAD & GIS Specialist

SMITH LAND SURVEYING, INC.

EXPERIENCE

2006-2012 **Thrasher Engineering Inc.** **Bridgeport, WV**
Survey CAD Technician

- Worked under five WV Licensed Surveyors and eight WV/PA licensed Professional Engineers.
- Drafted multiple property, easement, condemnation, well, and permit plats.
- Received information from field crews on a daily basis and updated base mapping and topographic mapping for the engineers and GIS departments
- Drafted as-built surveys and Alta surveys from start to finished product.
- Completed over 1000 miles of proposed and as-built pipeline surveys, working both indoors doing drafting / engineering, and outdoors surveying.
- Worked on long wall mining mapping and water sampling on multiple jobs, covering over 2000 homes and businesses, both in office and out. Doing water well sampling and mapping for every sampled home or business in the project area (within a 2 mile radius of a long wall mine).

2012 - Present **Smith Land Surveying** **Glenville, WV**
Geotechnical Drilling Manager / CAD & GIS Specialist

- Prepare base mapping and topographic mapping for multiple engineering and as-built sites.
- Complete as-built survey plats from start to finish.
- Worked on multiple proposed pipeline surveys.
- Prepared and set up information for geodatabasing in GIS.
- Drafting well plats, road approaches, and reclamation plans.
- Managing Geotechnical Drilling operations.
- Organizing and completing geotechnical testing evaluations.
- Setup final designs through Carlson Construction for use on Caterpillar and other GPS equipment for well site construction.

- Mapping and topo work with Cyclone and other Point Cloud software.
- Designing rough / preliminary pad and access road locations.
- Converting design files to shape files for client geodatabasing.
- Preparing exhibit maps and information for environmental permitting.
- Completing road condition surveys from start to finish.

PROJECT MANAGER

Jason McVicker

Telephone Number: 304-462-5634

Fax Number: 304-462-5656

Email Address: jmcvicker@slssurveys.com

SMITH LAND SURVEYING, INC.
SUB-CONSULTANT INFORMATION

Sub-Consultant Name: Blue Mountain, Inc.

Individuals Performing Work:

Craig Fry – Certified Photogramitrist, ASPRS [redacted] – 16 Years Experience
Seth Lemley – 9 Years Experience
Brian Tennant -- 9 Years Experience
Chris Bohon – 6 Years Experience
Jamie Whitmer – 5 Years Experience
Megan Gales – 4 Years Experience

Similar Work Completed by Blue Mountain, Inc.:

- Meathouse Stream Restoration (December 2014)
  Two (2) foot contours and plainmetrics for post mining stream restoration

- Fola Coal Reclamation Area (September 2015)
  Two (2) foot contours and plainmetrics updated to meet current conditions for reclamation work

- Bailey Mine Refuse Update (June 2015)
  Two (2) foot contours and plainmetrics updated to meet current conditions for reclamation work

- Cumberland Mine Railroad Slip Repair (May 2015)
  Two (2) foot contours and plainmetrics mapped to reflect current conditions for an earth slip next to the railroad

- Jackson Run Stream Restoration (August 2015)
  Two (2) foot contours and plainmetrics for post mining stream restoration

Similar Work Under Contract:

- Aerial Mapping and LiDAR for approximately fifteen (15) gas well pads of approximately 50-200 acre sizes for gas well development across North Central West Virginia

- Aerial mapping and LiDAR for approximately ten (10) gas line projects of various lengths in North Central West Virginia

- Pre-flown and ground control for over eight (8) million acres of the northern half of West Virginia for various projects in the region

Project Manager: Craig Fry – Certified Photogramitrist, ASPRS [redacted]

Number of Years Company has Performed this Type of Work: 10 Years

Smith Land Surveying, Inc.

Qualifications for Mapping Services

Completed Projects

Smith Land Surveying, Inc. (SLS) has provided services in AML and Bond Forfeiture Programs since the mid 1980s. We provided field based topographical mapping and cross sections for design firms such as Sturm Environmental and Stantec. Ground control and check surveys were provided for larger areas for the aerial mapping. SLS has worked with several aerial firms such as Keddal, Henderson, Photo Sciences, Kucera and Virginia Mapping.

SLS held the West Virginia Design Consultant Contract for the Bond Forfeiture Project for four (4) years in the early to mid 1990's. On the construction side, we provided mapping check surveys, "As-Builts" and construction stakeout for numerous AML contractors throughout West Virginia such as Green Mountain, Kanawha Stone and Ten A Coal.

SLS was the prime consultant on several projects involving aerial mapping, ranging from thirty-six (36) new school sites throughout West Virginia including Berkeley County, Randolph County High School and Robert C. Byrd High School in Harrison County, West Virginia and eight (8) new or expanded strip shopping center sites ranging from 10 – 80 acres in size in Weston, Summersville, Fairmont, Oakhill, Elkview, Fayetteville, Elkins and Lewisburg, West Virginia. On these sites, SLS provided the surveying, engineering and construction management services.

To further convey our company's experience and diversity of our understanding of the need for quality aerial and conventional base mapping, SLS was the prime contractor for the U.S. Soil Conservation Service for the Jesse Marks Ramp Project (See Summary Below). This was a total turnkey project for mapping and design with construction management and construction through to the final reclamation while working in conjunction with the Soil Conservation Service's Morgantown office.

PROJECT SUMMARIES

1998-2013

- **Jesse Marks Ramp AML Project (1988-1989)**

  Client: US Soil Conservation Service
  As the prime contractor, SLS removed damaged drain pipe from abandoned mines, installed new pipe, undercut and repaired slip area of approximately 0.5 acres and provided final reclamation. SLS contracted and coordinated excavation and heavy equipment and provided project management.

- **46 sq. Mile Mapping Project with Horizontal and Vertical State Plane Control (1989-1992)**

  Client: Consolidation Coal Company
  SLS provided horizontal state plane coordinates and vertical control for 46 sq. mile ± project area including control data and detail aerial mapping of approximately 6 sq. miles. SLS surveyed boundary locations for the central project area of 29 contiguous tracts totaling 1565 acres ±, 200

proposed and completed drill sites for testing coal seams and water levels and quality, location of existing natural gas utility pipelines, proposed haul roads and sediment control dams and level network for 4 miles ± of seismic testing. SLS generated cross sections and profile data for a proposed beltline system and detailed location of existing railroad tracks and right-of-way lines.

- **Mapping and Control Data for 3 Miles ± of State Route 16 Relocation**

  Client: Natural Resources Conservation Service
  SLS provided horizontal and vertical control for 3 miles ± of State Route 16 relocation and connector access on more than 40 boundary surveys for the parcels to accommodate the relocation of various highways in Ritchie County, West Virginia. Take parcels were required to have individual take plats and new legal descriptions for each right-of-way take. The relocations were necessary due to a major dam facility proposed on the North Fork Hughes River on which SLS served as surveying and mapping contractor.

- **Ten (10) Acre Boundary and Five (5) Acre Topographic Survey**

  Client: Sturm Environmental Services, Inc.
  SLS performed a 5 acre topographic survey with control network to use for design and reclamation of abandoned coke ovens and mine drainage along with mapping for a wetland enhancement for water quality. SLS completed a ten acre boundary survey with complete cross sections to provide a boundary/topographic survey to be used for design. Additionally, SLS provided layout, control and design for several AML projects for Sturm Environmental Services, Inc.

- **Twenty-Two (22) Mile ± Pipeline Survey**

  Client: Trans Appalachian Pipeline System
  SLS surveyed and mapped 22 miles of pipeline from Smithville, West Virginia to Columbia Station in Glenville, West Virginia. SLS coordinated the archaeological study and environmental review for the EPA. SLS prepared all regulatory permitting for streams, rivers and highways affected by the pipeline and an Erosion and Sediment Control Plan (NPDES). SLS also provided assistance in obtaining right-of-ways for the pipeline and access easements.

- **Eight (8) Mile Portion of Corridor "H" Serving North Central West Virginia**

  Client: URS Greiner, Inc.
  SLS surveyed an eight mile portion of the new 4-lane east-west corridor of Corridor "H" for the development of final construction plans. SLS established a horizontal and vertical control network including stakeout, cross sections and profile work for mapping verification on 8 miles mainline and 2.5 miles side roads. SLS provided the research, surveying, mapping and utility locations for the boundary mosaic covering the same area.

2014-2015

SLS has performed surveying and design services for gas and energy production companies for the last seven years. These site design services include designs for well pads, water impoundments, tank pads and access roads. Mapping for these projects was originally done using conventional survey methods

(survey crews on the ground). In order to produce mapping in a more efficient and timely manner, SLS and Kucera International Inc. embarked on a joint venture in 2014. Approximately 3500 sq. miles of North Central West Virginia were flown for data capture using aerial mapping and LiDAR data. In the past, this data was usually obtained during leaf-off times and good weather conditions. Now, SLS has this data available year round and is processed on a site by site basis. This approach has allowed SLS to respond quickly to the time sensitive needs of our clients. The LiDAR backed mapping allows for greater accuracy and more reliable earthwork calculations. SLS has provided these services for gas related projects for a variety of companies including EQT Production Company, CNX Gas, Mountaineer Keystone, Stone Energy, PDC Energy and others. Our volume of work has averaged approximately fifty sites per year.

- **Buckhannon Pipe Yard Site (2015)**

  Client: Precision Pipeline
  SLS provided aerial mapping, surveying, engineering and design, and environmental services for the Buckhannon Pipe Yard in Buckhannon, West Virginia.

- **Meadowbrook Road Pipe Yard Site (2015)**
  Client: Precision Pipeline
  SLS provided aerial mapping, engineering and design, and environmental services for the Meadowbrook Road Pipe Yard in Bridgeport, West Virginia.

- **Greendale Coal Site (2015)**

  Client: Stantec Consulting Services
  SLS provided aerial mapping and survey services for the Greendale Coal Site in Clay and Nicholas Counties, West Virginia.

- **Ace and Gary Well Pad Site (2015)**

  Client: Mountaineer Keystone
  SLS provided aerial mapping, surveying, engineering and design for two well pads, tank pad, flowback pit and access road located near Rosemont, West Virginia.

- **Oxford 386 Well Pad Site (2015)**

  Client: EQT Production Company
  SLS provided aerial mapping, surveying, engineering and design for a well pad, completion pit, flowback pit and access road located near Summers, in Doddridge County, West Virginia.

Smith Land Surveying, Inc.

Qualifications for Mapping Services

Current Projects Under Contract

- **Six New Gas Well Pad Sites**

  Client: EQT Production Company
  SLS is providing aerial mapping, survey control, and boundary survey work for well plat and permitting purposes, engineering and site design, survey stakeout for construction and site As-Builts. SLS also provides environmental and regulatory assistance.

- **One New Gas Well Pad Site**

  Client: Mountaineer Keystone
  SLS is providing aerial mapping, survey control, and boundary survey work for well plat and permitting purposes, engineering and site design, survey stakeout for construction and site As-Builts.

- **Two New Gas Well Pad Sites**

  Client: Larson Design Group
  SLS is providing aerial mapping and survey control.

- **500 Acre ± Unit Boundary**

  Client: Larson Design Group
  SLS is providing mapping and boundary survey services for one of Larson Design Group's clients.

- **Six Cell Tower Sites in North Central West Virginia**

  Client: Aerial Erectors
  SLS is providing field run topography of a .5 Acre ± cell tower site and for access roads ranging in length from 1800 feet to 5000 feet, boundary survey to provide lease area plats and survey stakeout for construction.

- **Individual Boundary Surveys**

  Client: Various
  SLS is providing a variety of boundary and mapping surveys with some environmental and flood plain services, ranging from city lots to large acreage rural tracts.

Purchasing Divison
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Request for Quotation

Proc Folder: 133232

Doc Description: Addendum 01: Mapping Services in Northern West Virginia

Proc Type: Central Master Agreement

Date Issued	Solicitation Closes	Solicitation No	Version
2015-10-05	2015-10-29 13:30:00	CRFQ 0313 DEP1600000017	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Name, Address and Telephone Number:

FOR INFORMATION CONTACT THE BUYER

Beth Collins
(304) 558-2157
beth.a.collins@wv.gov

Signature X Gregory A. Smith **FEIN #** 55-0669832 **DATE** 10-28-15

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

Addendum No. 01:
This addendum is issued to modify the solicitation per the attached documentation and the following:
1. To delete line 4 on the commodity lines for 'Mobile Scanner' this line was added in error.
No other changes.

CRFQ
THE WEST VIRGINIA STATE PURCHASING DIVISION FOR THE AGENCY, THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, IS SOLICITING BIDS FOR AN OPEN END CONTRACT FOR MAPPING SERVICES IN THE NORTHERN COUNTIES OF WEST VIRGINIA, PER THE ATTACHED SPECIFICATIONS AND DOCUMENTATION.

ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Control Surveying	600.00000	HOUR	$56.00	$33600.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Control Surveying

ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	Topographic, Planimetric and Check Surveying	1800.00000	HOUR	$56.00	$100800.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Topographic, Planimetric and Check Surveying

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
3	Terrestrial LIDAR Collection	600.00000	HOUR	$64.00	$38400.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Terrestrial LIDAR Collection

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
4	Mobile Scanner	300.00000	HOUR	LINE 4 DELETED PER ADDENDUM #1	

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Line is inactive, not a bidable line.
Mobile Scanner

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
5	Topographic Mapping - Aerial Photography (0-25 Acres)	15.00000	ACRE	$175.00	$2625.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
(including LIDAR Collections)

List only one rate for each category.

ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
6	Topographic Mapping - Aerial Photography (25-50 Acres)	30.00000	ACRE	$95.00	$2850.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
(including LIDAR Collections)

List only one rate for each category.

ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
7	Topographic Mapping - Aerial Photography (50-100 Acres)	75.00000	ACRE	$40.00	$3000.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
(including LIDAR Collections)

List only one rate for each category.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
8	Topographic Mapping - Aerial Photography (Over 100 Acres)	125.00000	ACRE	$22.50	$2812.50

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
(including LIDAR Collections)

*NOTE: SITES OVER 500 ACRES WILL BE AT $8.00/ACRE

List only one rate for each category.

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
9	Licensed Land Surveyor	600.00000	HOUR	$88.00	$52800.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Professional Rates (Listed Disciplines Only)

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
10	Survey Manager	1200.00000	HOUR	$77.00	$92400.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Professional Rates (Listed Disciplines Only)

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
11	Mapping/CAD Technician	2400.00000	HOUR	$74.00	$177600.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Professional Rates (Listed Disciplines Only)

INVOICE TO	SHIP TO
ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV25304 US	ENVIRONMENTAL PROTECTION OFFICE OF AML&R 601 57TH ST SE CHARLESTON WV 25304 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
12	Travel Per Diem (Rate/Person)Day)	125.00000	EA	$110.00	$13750.00

Comm Code	Manufacturer	Specification	Model #
81151601			

Extended Description :
Applicable to Survey Crews Only

GRAND TOTAL: $520637.50

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Tech Question Deadline at 5:00PM, EST	2015-10-02

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CRFQ DEP 1600000017

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

[X]	Addendum No. 1	[ ]	Addendum No. 6
[ ]	Addendum No. 2	[ ]	Addendum No. 7
[ ]	Addendum No. 3	[ ]	Addendum No. 8
[ ]	Addendum No. 4	[ ]	Addendum No. 9
[ ]	Addendum No. 5	[ ]	Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

SMITH LAND SURVEYING, INC.
Company

Gregory A. Smith
Authorized Signature

10-28-15
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

SMILA03 OP ID: RC

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/27/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Jim Lively Insurance PO Box 1633 531 Jones Ave. Oak Hill, WV 25901 Robin Chapman	CONTACT NAME: PHONE (A/C, No, Ext): FAX (A/C, No): E-MAIL ADDRESS:
INSURED Smith Land Surveying, Inc. P.O. Box 150 Glenville, WV 26351-0150	INSURER(S) AFFORDING COVERAGE / NAIC # INSURER A : Westfield Insurance 24112 INSURER B : Travelers Insurance 36137 INSURER C : INSURER D : INSURER E : INSURER F :

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$ 1,000,000
	X CLAIMS-MADE ☐ OCCUR			TRA7841510	08/01/2015	08/01/2016	DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 500,000
B				106171665	08/01/2015	08/01/2016	MED EXP (Any one person)	$ 5,000
	X EPLI INCL 3RD PAR						PERSONAL & ADV INJURY	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 2,000,000
	☐ POLICY ☐ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$ 2,000,000
	OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
A	X ANY AUTO			TRA7841510	08/01/2015	08/01/2016	BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$ 1,000,000
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$ 1,000,000
								$
	X UMBRELLA LIAB X OCCUR						EACH OCCURRENCE	$ 9,000,000
A	☐ EXCESS LIAB ☐ CLAIMS-MADE			TRA7841510	08/01/2015	08/01/2016	AGGREGATE	$ 9,000,000
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						☐ PER STATUTE ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ N / A (Mandatory in NH)						E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

STATE OF WEST VIRGINIA
2019 WASHINGTON ST., EAST
CHARLESTON, WV 25305

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Robin Chapman *Robin Chapman*

SMITH-2 OP ID: CD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 10/27/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Commercial Insurance Services 346 MacCorkle Ave. Ste #200 Charleston, WV 25314 Brent J. Burton	CONTACT NAME: Brent J. Burton PHONE (A/C, No, Ext): 304-345-8000 FAX (A/C, No): 304-345-8014 E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : RLI Insurance Company	13056
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED: Smith Land Surveying Inc.
Gregory A. Smith
P. O. Box 150
Glenville, WV 26351-0150

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ CLAIMS-MADE ☐ OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$
	☐ POLICY ☐ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$
	☐ OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	☐ UMBRELLA LIAB ☐ OCCUR						EACH OCCURRENCE	$
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						☐ PER STATUTE ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ N / A (Mandatory in NH)						E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$
A	Professional Liab			RENEWAL OF RDP0017396	10/27/2015	10/27/2016	Prof Liab	2,000,000
							Retention	40,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

STATEOF

State of WV Dept of Admin
2019 Washington Street, E
Charleston, WV 25305-0130

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

CONTACT INFORMATION

Sarah A. Smith

Telephone Number: 304-462-5634

Fax Number: 304-462-5656

Email Address: ssmith@slssurveys.com

Rev. 04/14

State of West Virginia
VENDOR PREFERENCE CERTIFICATE

Certification and application* is hereby made for Preference in accordance with ***West Virginia Code***, §5A-3-37. (Does not apply to construction contracts). ***West Virginia Code***, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the ***West Virginia Code***. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Vendor Preference, if applicable.

1. **Application is made for 2.5% vendor preference for the reason checked:**

___ Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or,**

_X_ Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or,**

___ Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; **or,**

2. **Application is made for 2.5% vendor preference for the reason checked:**

_X_ Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or,**

3. **Application is made for 2.5% vendor preference for the reason checked:**

___ Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or,**

4. **Application is made for 5% vendor preference for the reason checked:**

_X_ Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; **or,**

5. **Application is made for 3.5% vendor preference who is a veteran for the reason checked:**

___ Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; **or,**

6. **Application is made for 3.5% vendor preference who is a veteran for the reason checked:**

___ Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

7. **Application is made for preference as a non-resident small, women- and minority-owned business, in accordance with *West Virginia Code* §5A-3-59 and *West Virginia Code of State Rules*.**

_X_ Bidder has been or expects to be approved prior to contract award by the Purchasing Division as a certified small, women- and minority-owned business.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (West Virginia Code, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: SMITH LAND SURVEYING, INC. **Signed:** Gregory A. Smith

Date: 10-28-15 **Title:** OWNER

RFQ No. DEP 1600000017

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: SMITH LAND SURVEYING, INC.

Authorized Signature: Gregory A. Smith Date: 10-28-15

State of West Virginia

County of Gilmer, to-wit:

Taken, subscribed, and sworn to before me this 28th day of October, 2015.

My Commission expires May 3, 2016.

AFFIX SEAL HERE

NOTARY PUBLIC Amanda R. Conley

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
AMANDA R. CONLEY
PO BOX 150
GLENVILLE, WV 26351
My commission expires May 3, 2016