

A TALE OF TWO SENSORS

A SIDE-BY-SIDE COMPARISON OF TWO AGC SENSORS ACROSS CHALLENGING TERRAIN

Jessie Powers, Tetra Tech



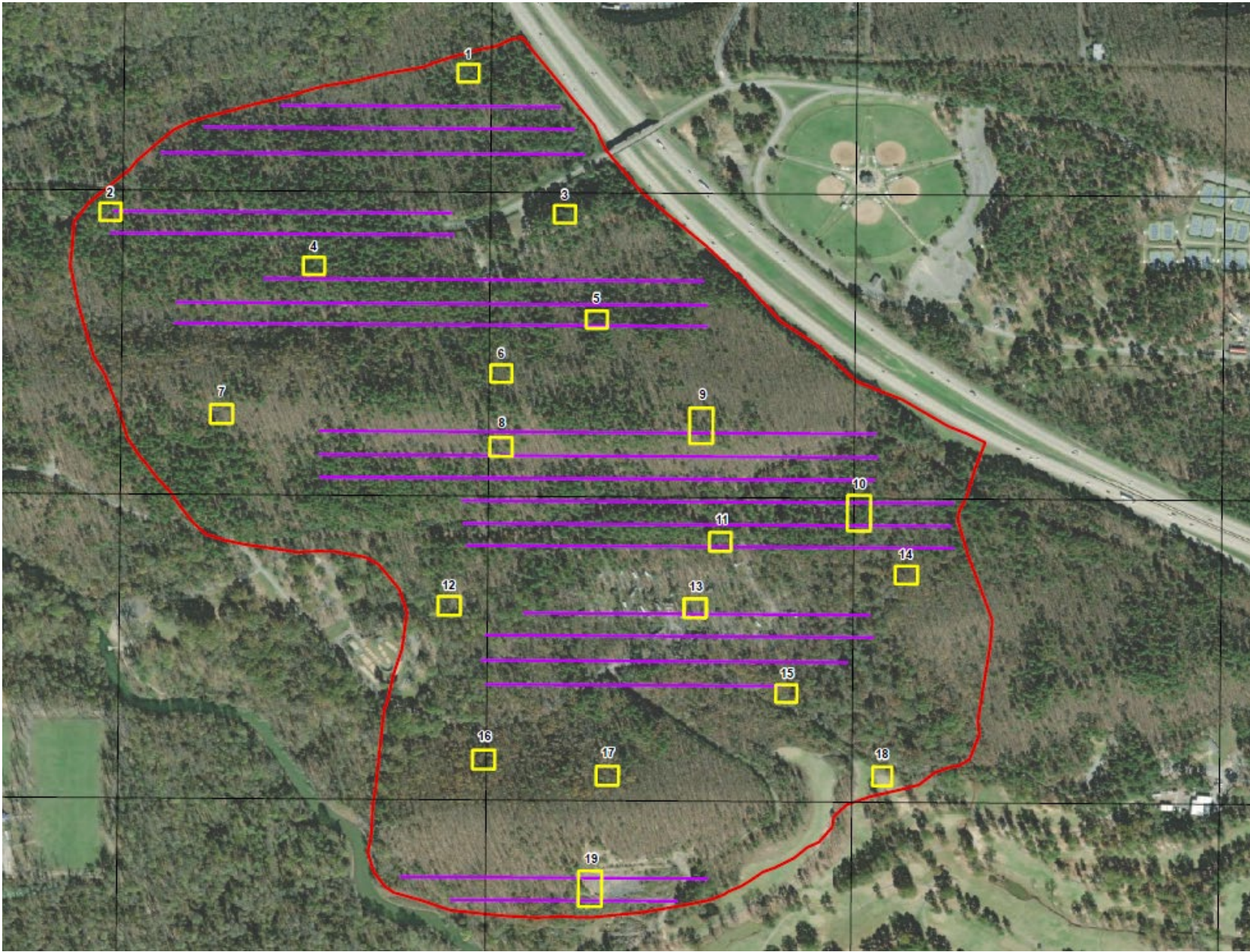
Geometrics MetalMapper 2x2

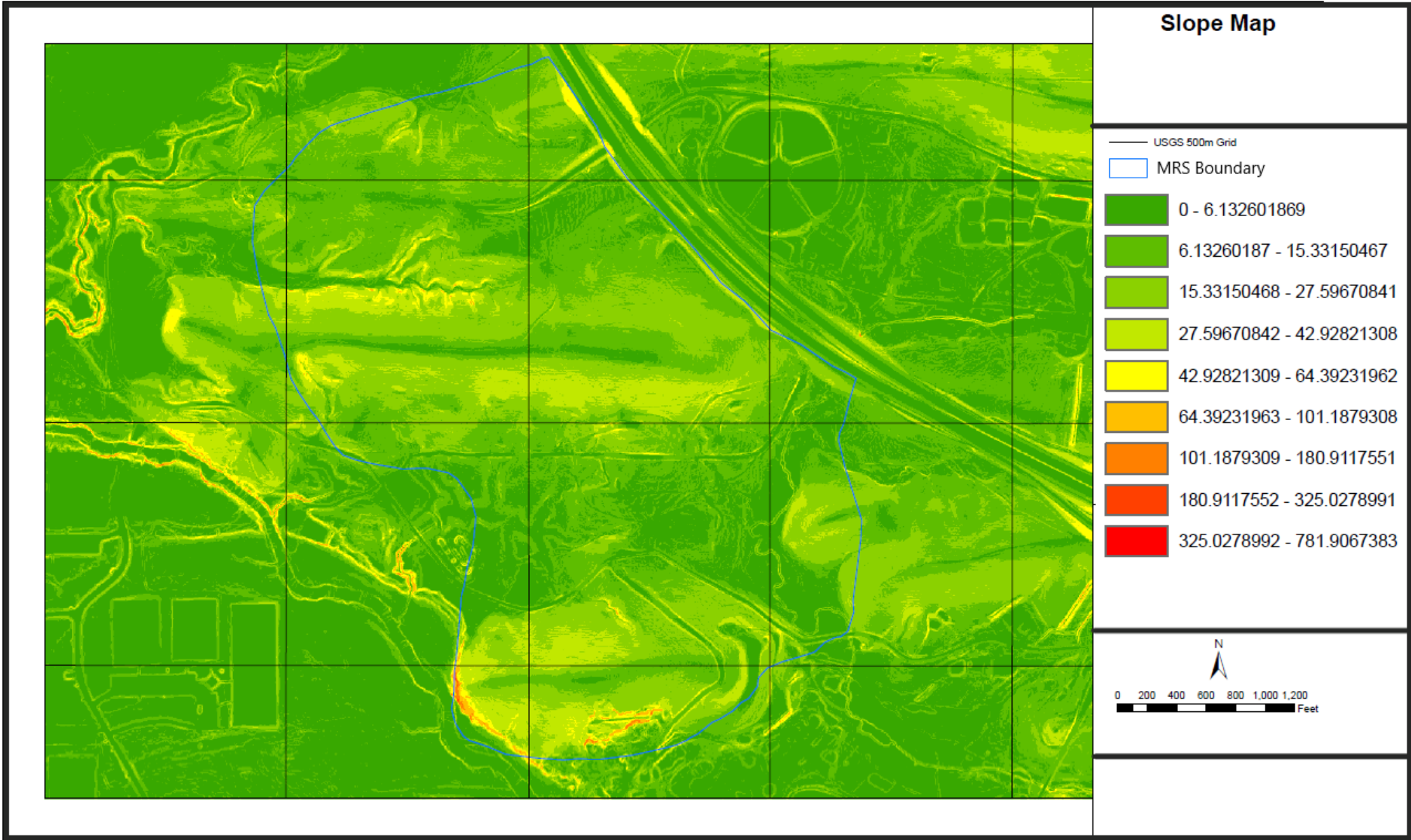
- Two-pass classification sensor
- Deck height = 26cm
- Max Dynamic collection speed = 0.7m/s
- Fiberglass frame

White River Technologies APEX

- One-pass classification sensor
- Deck height = 10cm
- Max Dynamic collection speed = 0.5m/s
- Carbon-Fiber/3-D printed frame



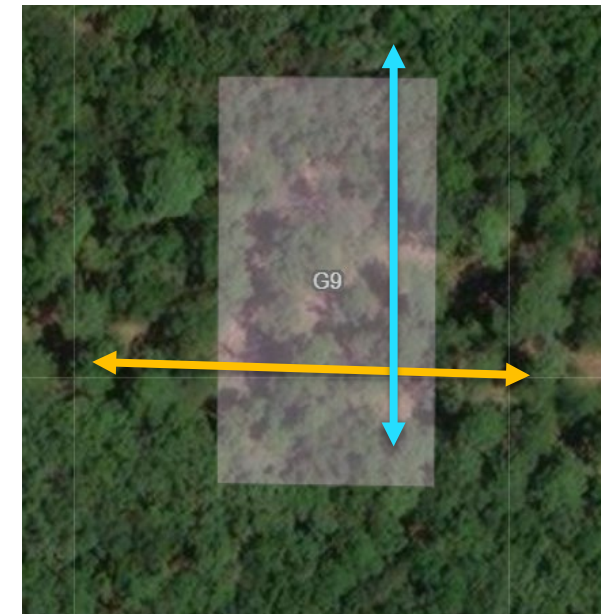






MM2x2 Navigation Software

#GeoID	Data Type	TargetID	easting	northing	zone
GRID01	DAM	0	XXXXXXXX.XX	YYYYYYY.YY	UTM Zone
GRID01	DAM	0	XXXXXXXX.XX	YYYYYYY.YY	UTM Zone
GRID01	DAM	1	XXXXXXXX.XX	YYYYYYY.YY	UTM Zone
GRID01	DAM	1	XXXXXXXX.XX	YYYYYYY.YY	UTM Zone
GRID01	DAM	2	XXXXXXXX.XX	YYYYYYY.YY	UTM Zone
GRID01	DAM	2	XXXXXXXX.XX	YYYYYYY.YY	UTM Zone
GRID01	DAM	3	XXXXXXXX.XX	YYYYYYY.YY	UTM Zone
GRID01	DAM	3	XXXXXXXX.XX	YYYYYYY.YY	UTM Zone



APEX Navigation Software

Speed **0.31 m/s**

Zoom In Zoom Out

Set to Current Grid Clear Path

Polygons Lines Points

Load Coverage Clear Coverage

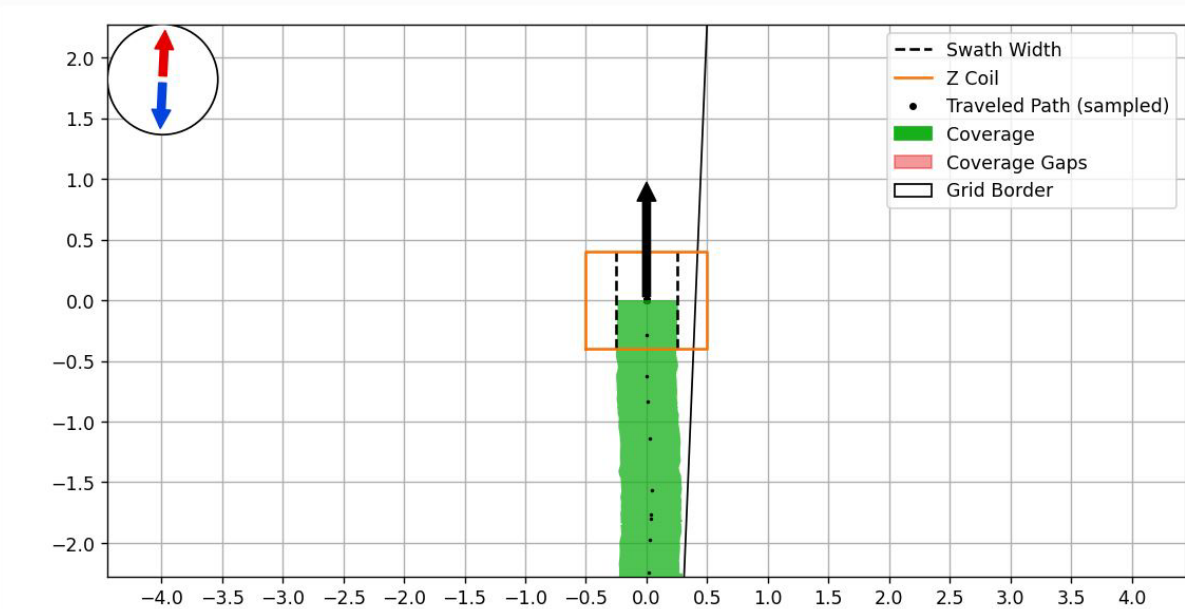
Load Gap Clear Gap

Load Grid Clear Grid

New Poly Save Poly

GPS Heading: 355.26

IMU Heading: 357.20



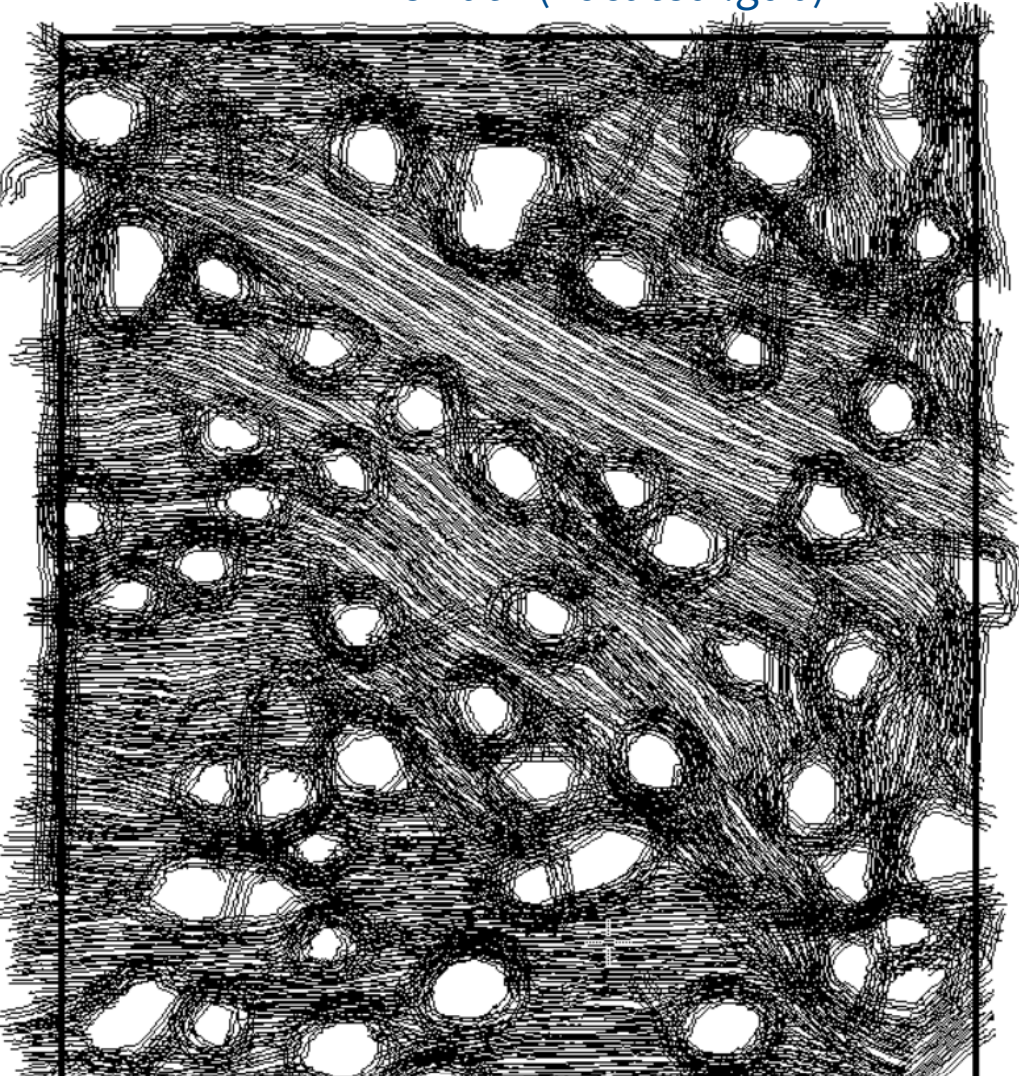
Navigation icons: Home, Left, Right, Center, Zoom, Grid, Path, Save

x=4.201 y=1.423

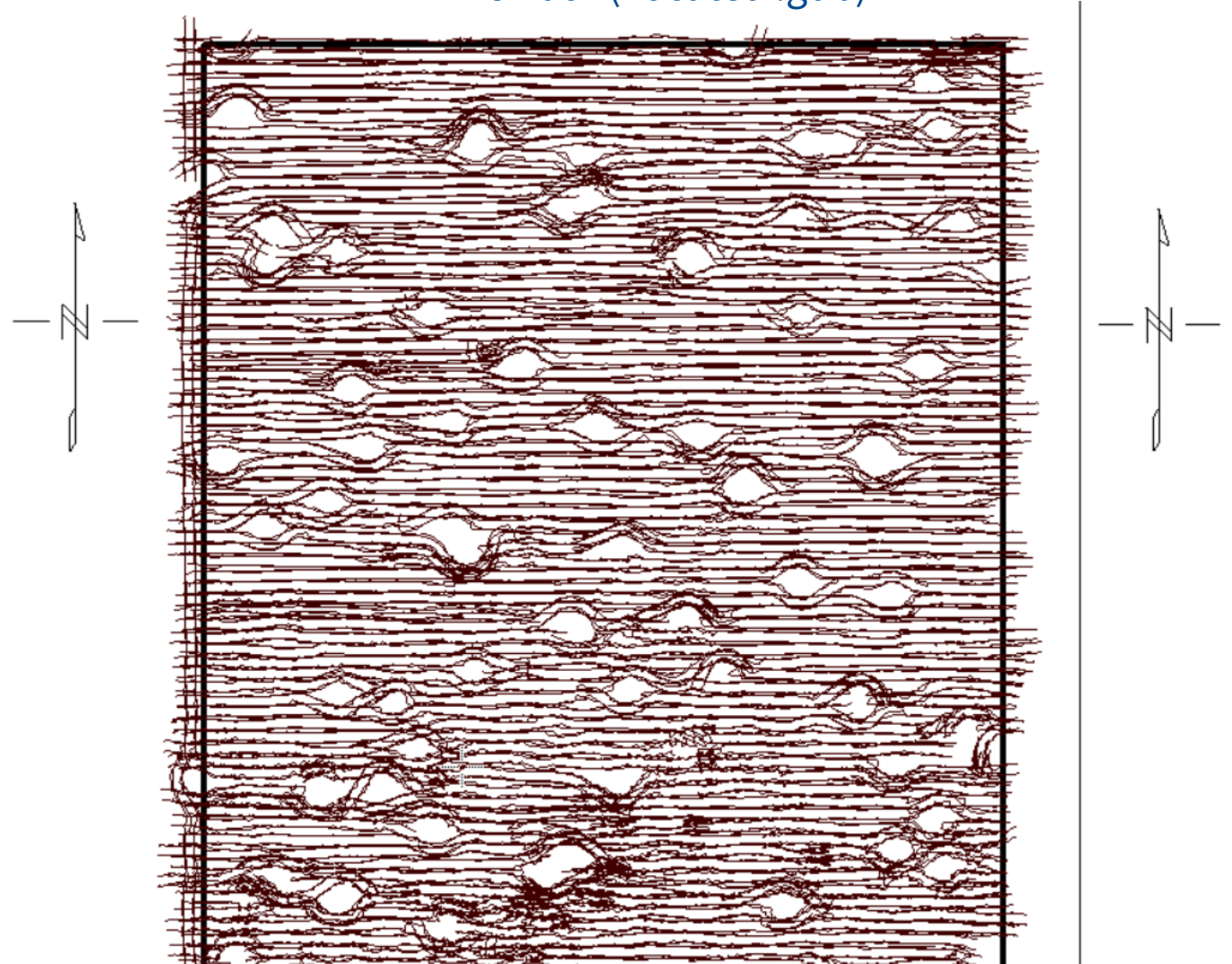


Grid 09 – changing slope directions, rocky, steep

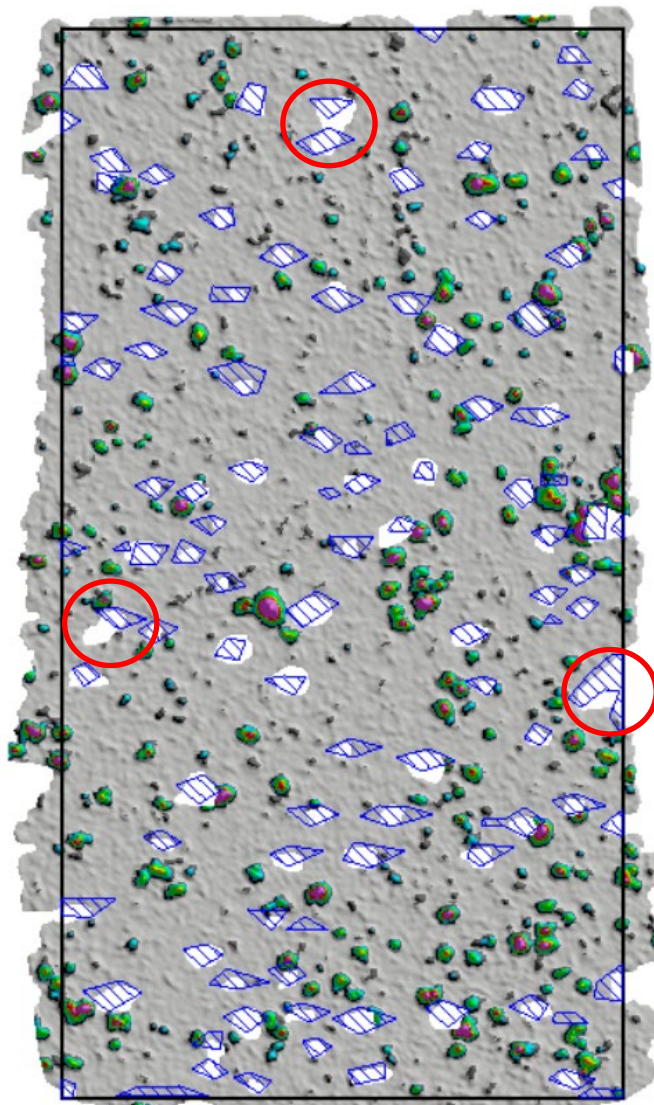
APEX Line Path (Located .gdb)



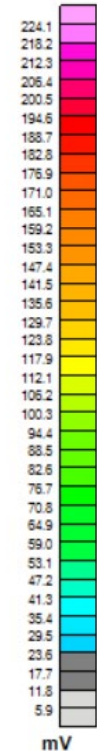
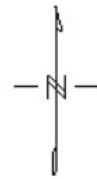
MM2x2 Line Path (Located .gdb)



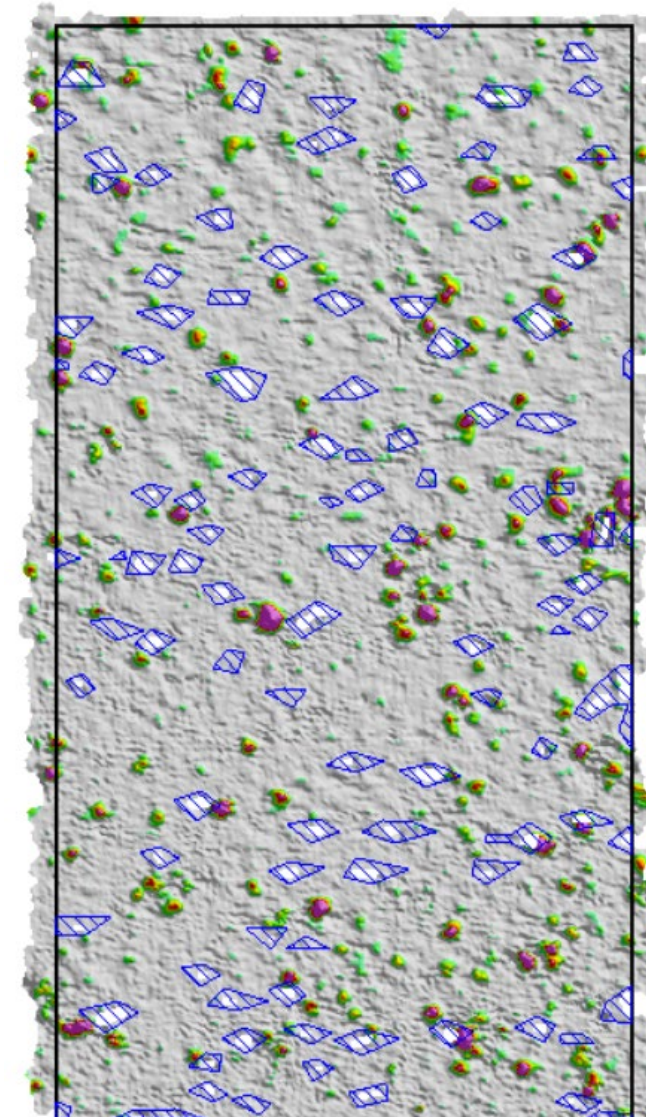
Grid 09 – data results



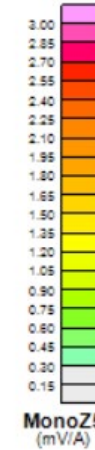
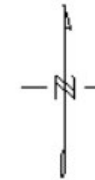
APEX



- 300 targets
- 0.06 acres of obstructions
- 1042 sources
- 115 TOI

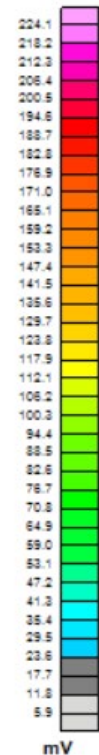
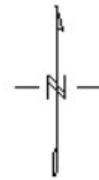
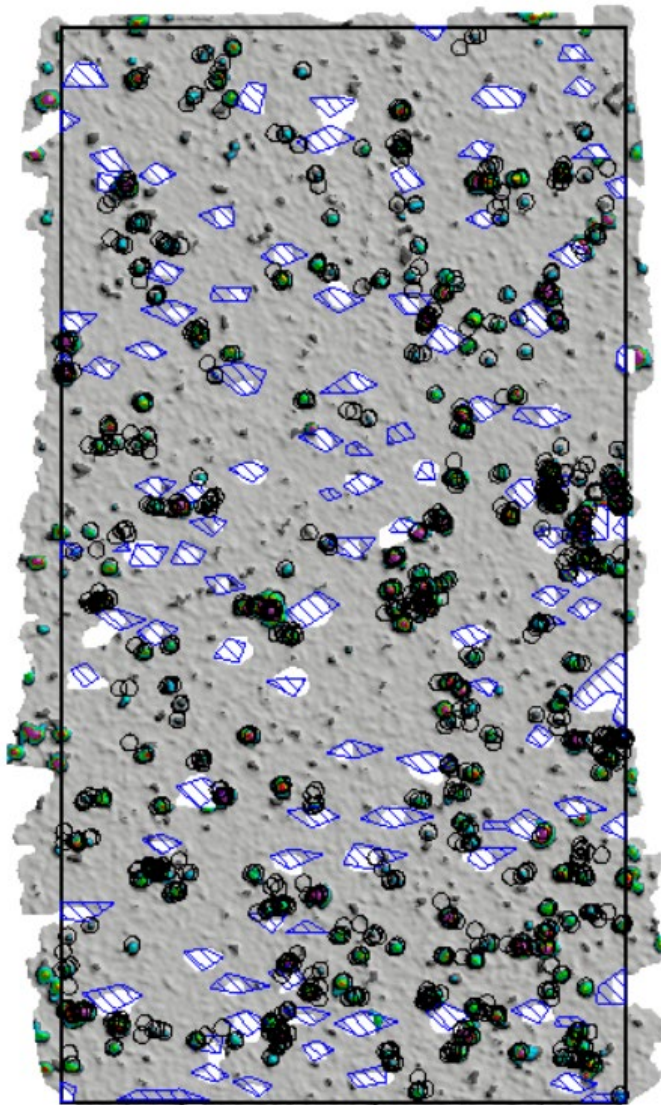


MM2x2

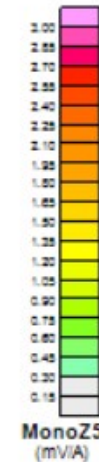
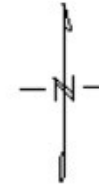
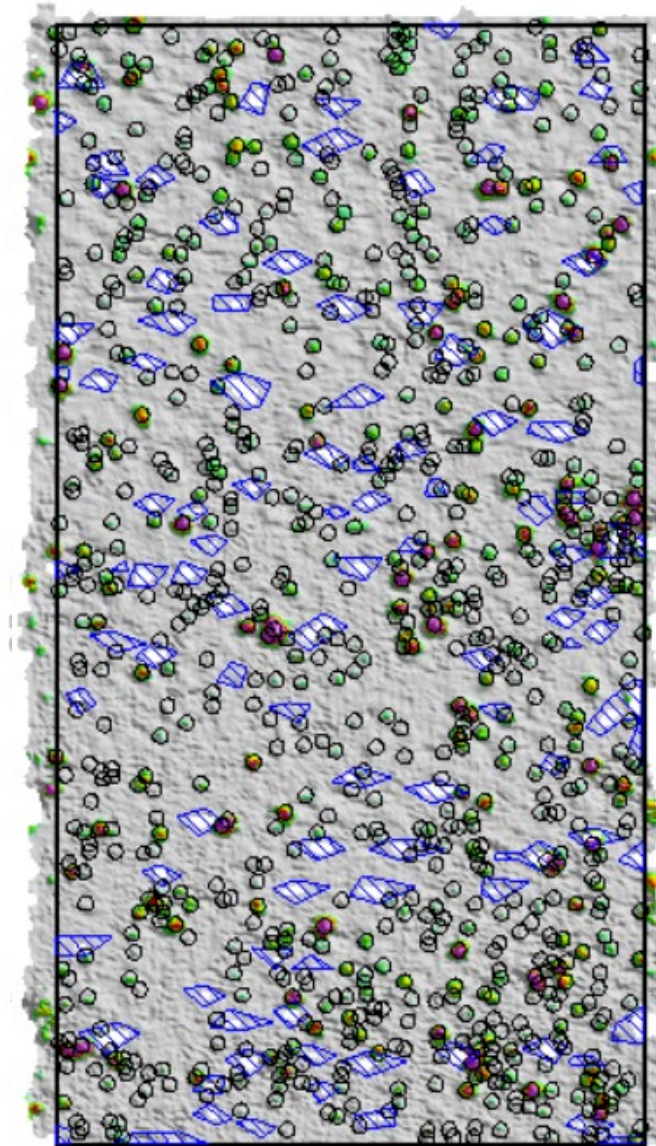


- 868 targets
- 0.04 acres of obstructions

Grid 09 – data results



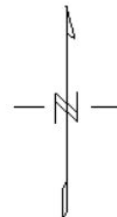
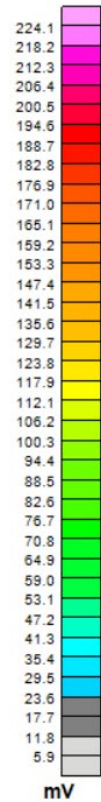
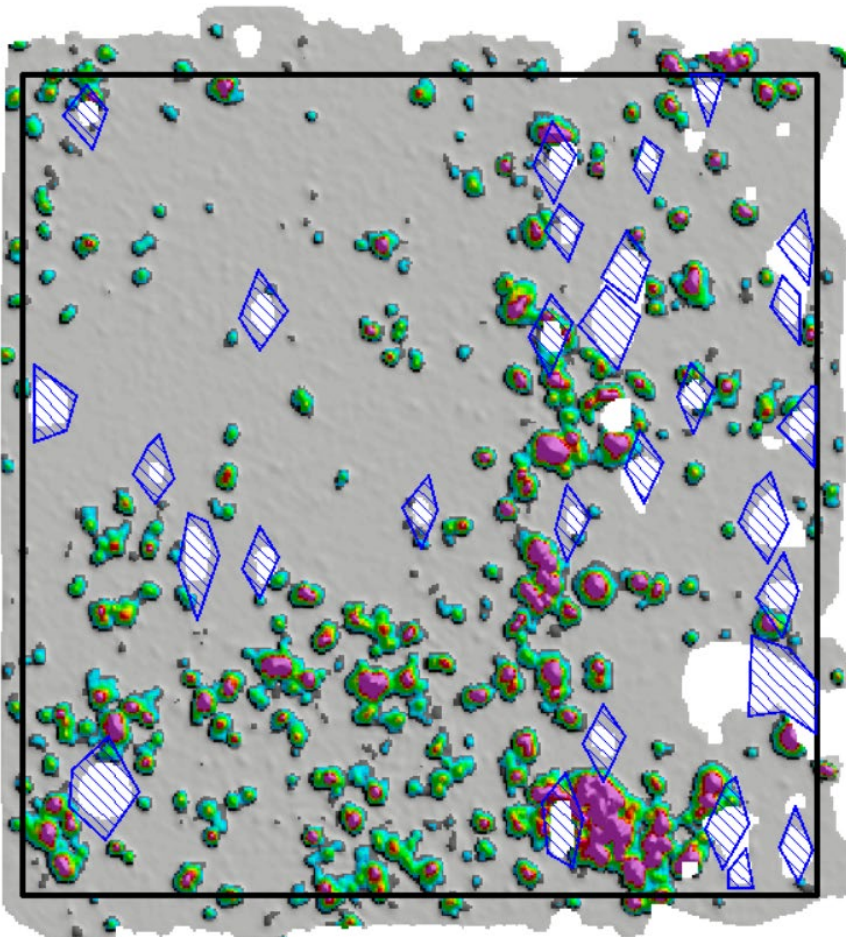
- 300 targets
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- 868 targets
- 0.04 acres of obstructions

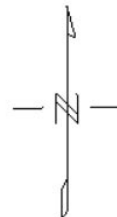
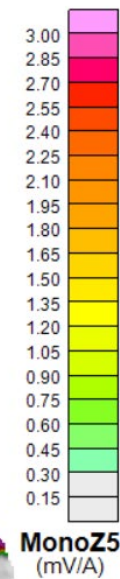
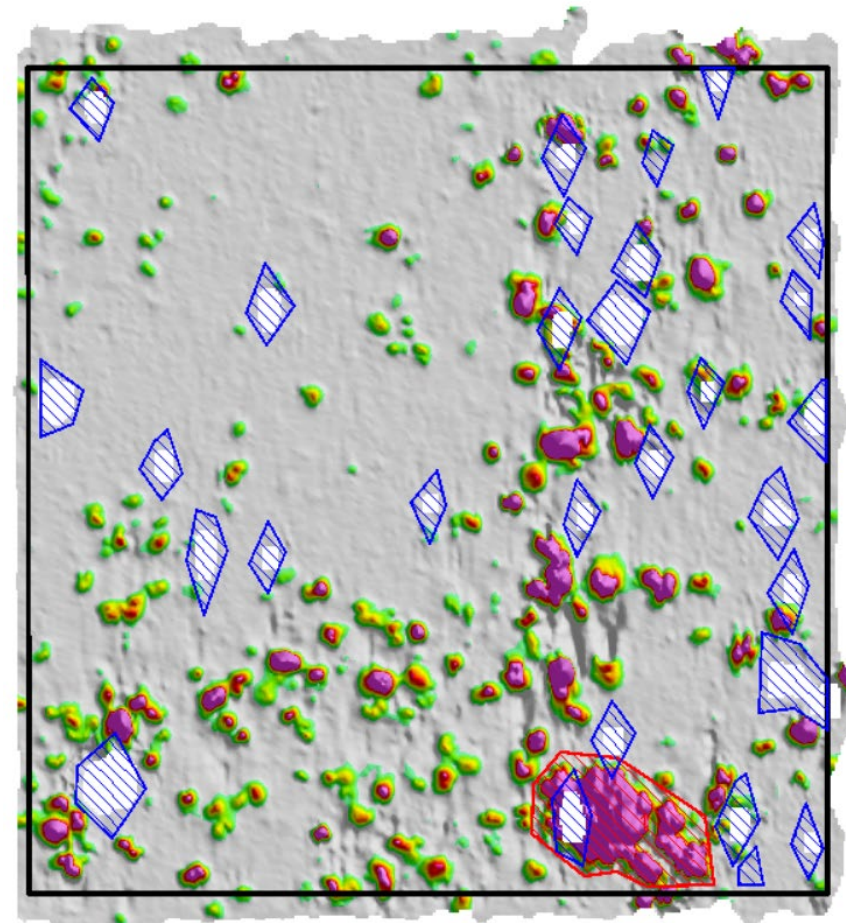
Grid 12 – data results

APEX



Obstructions

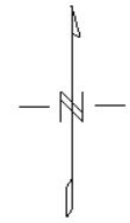
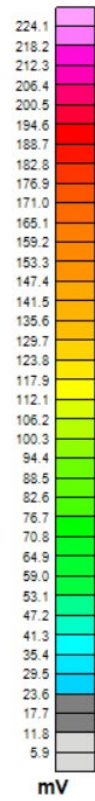
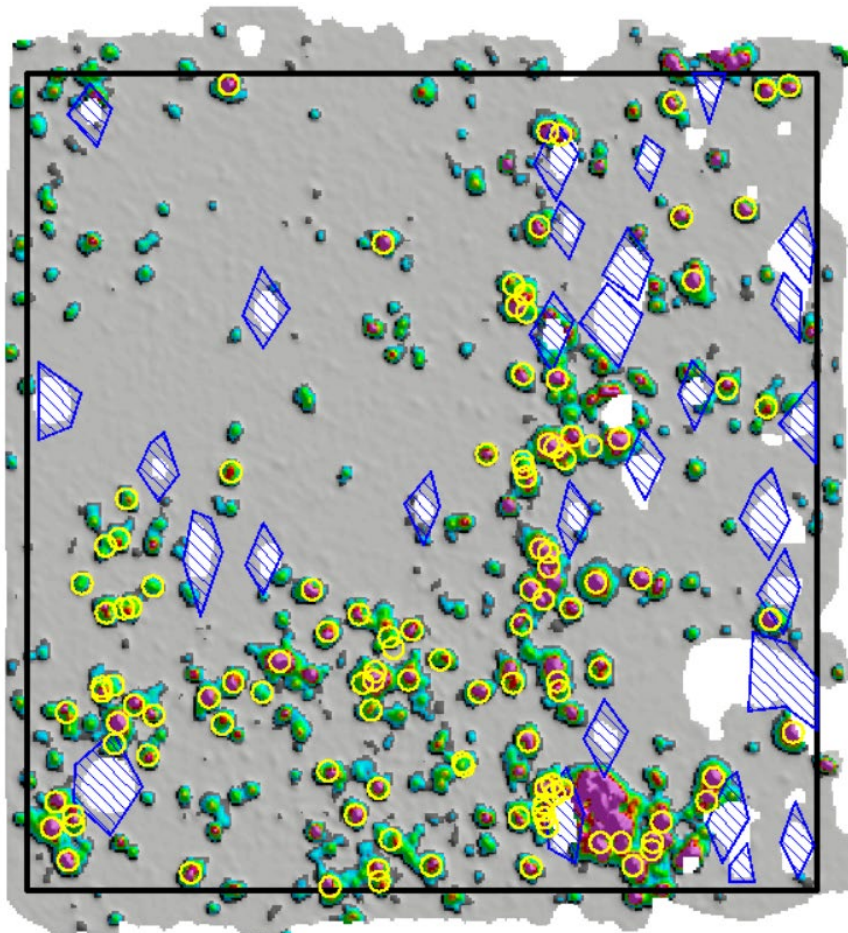
MM2x2



Obstructions
SRA

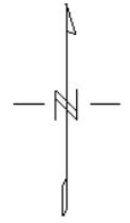
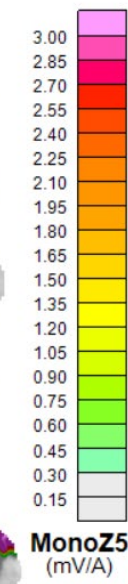
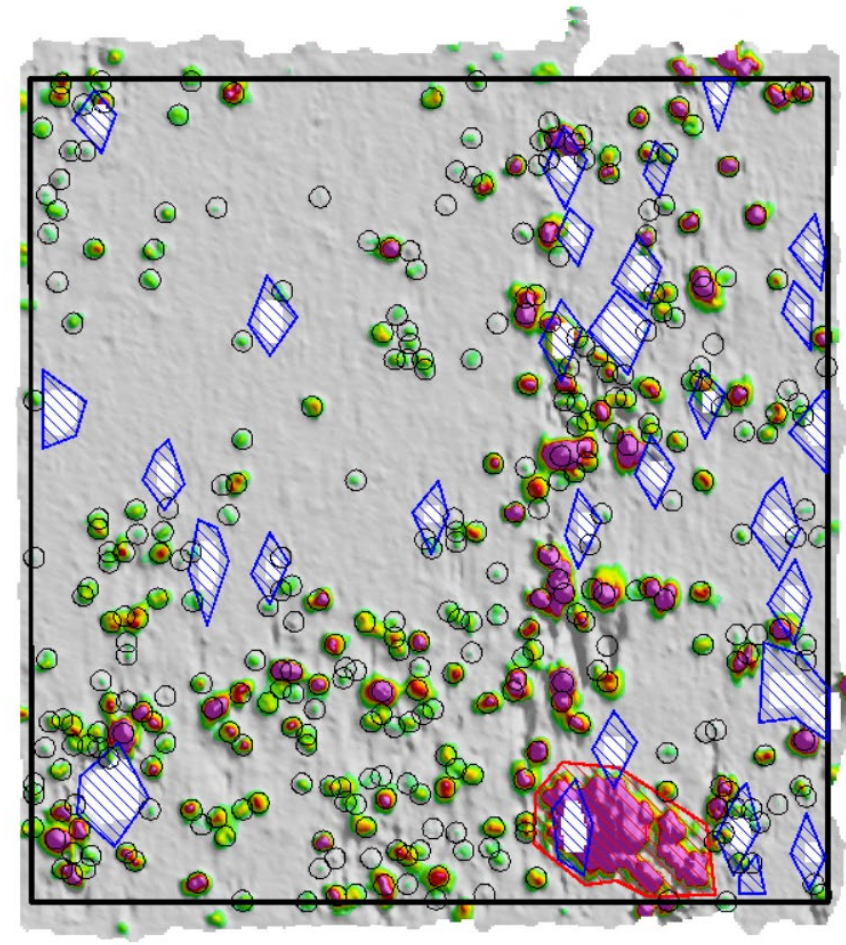
Grid 12 – data results

APEX



- Obstructions
- TOI

MM2x2



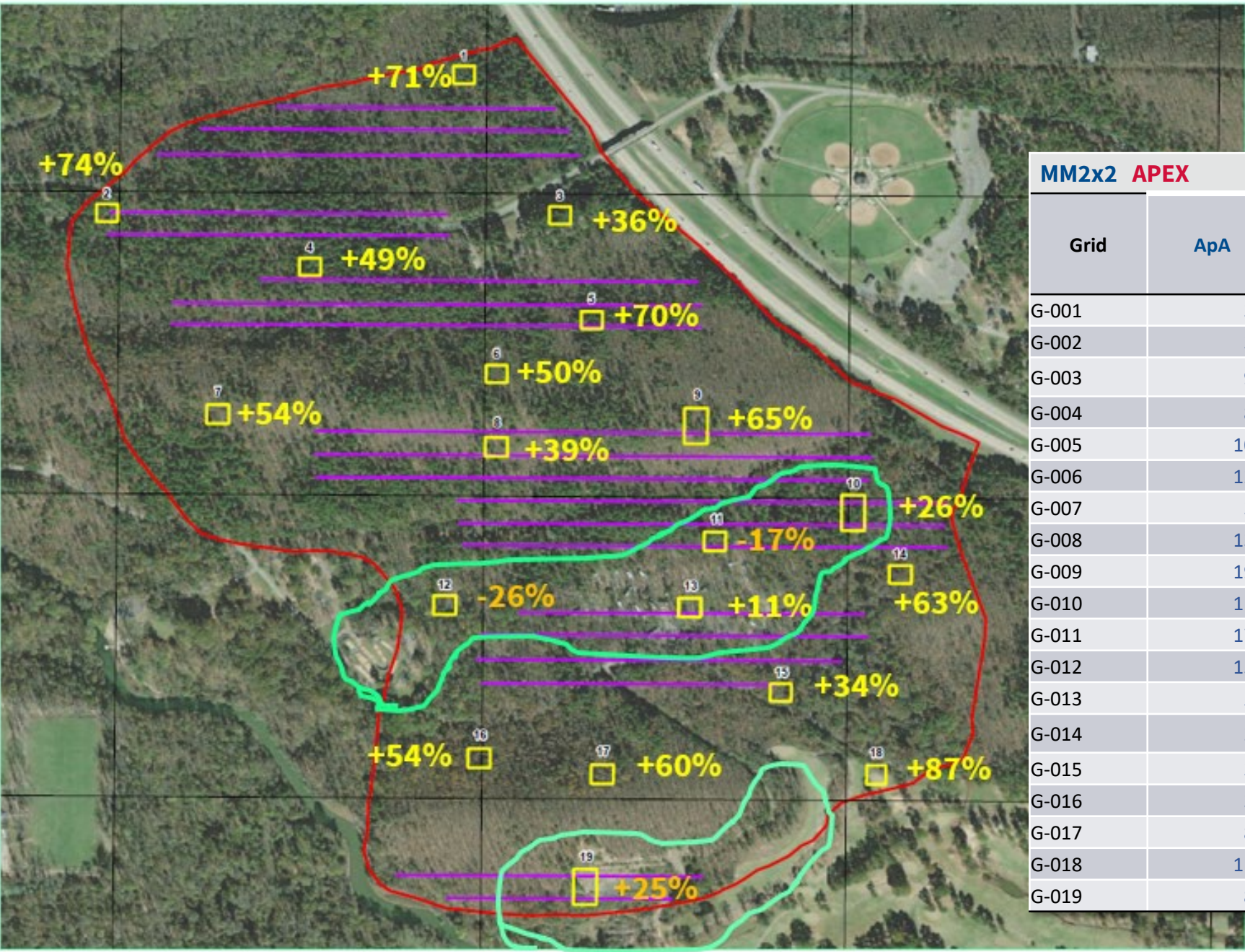
- Obstructions
- Targets
- SRA

MM2x2 APEX

Grid	Grid Size (acres)	Obstruction Size (acres)	Obstruction Size (acres)	Coverage (acres)	Coverage (acres)	Coverage comparison	Dynamic Hours (MM2x2)	One-Pass Hours (APEX)
G-001	0.23	0.02	0.02	0.21	0.20	0.008	4	5
G-002	0.23	0.06	0.06	0.17	0.17	0.006	4	5
G-003	0.22	0.01	0.02	0.21	0.20	0.007	4	4
G-004	0.22	0.03	0.04	0.19	0.18	0.009	4	4
G-005	0.22	0.02	0.04	0.20	0.19	0.009	4	4
G-006	0.22	0.02	0.03	0.20	0.20	0.003	4	4
G-007	0.25	0.02	0.03	0.23	0.22	0.008	4	5
G-008	0.24	0.02	0.03	0.22	0.22	0.004	4	5
G-009	0.48	0.04	0.06	0.44	0.42	0.021	8	10
G-010	0.48	0.03	0.03	0.45	0.46	-0.004	8	10
G-011	0.25	0.02	0.02	0.23	0.23	0.007	4	5
G-012	0.25	0.02	0.03	0.23	0.22	0.008	4	5
G-013	0.24	0.01	0.02	0.23	0.23	0.007	4	5
G-014	0.33	0.02	0.02	0.31	0.32	-0.007	6	7
G-015	0.22	0.01	0.02	0.21	0.21	-0.001	4	4
G-016	0.25	0.02	0.03	0.23	0.22	0.011	4	5
G-017	0.25	0.02	0.04	0.23	0.21	0.016	4	5
G-018	0.14	0.01	0.01	0.13	0.13	-0.004	2	3
G-019	0.45	0.05	0.04	0.40	0.42	-0.018	8	9
Total	5.17	0.45	0.59	4.72	4.63	0.005	86	103

MM2x2 APEX

Grid	Grid Size (acres)	SRA Size (acres)	SRA Size (acres)	Targets	Targets	Target comparison	Target % difference (MM2x2 > APEX)	ApA	ApA	Sources	Sources / acre
G-001	0.23	0.00	0.00	66	19	47	-71	311	93	45	221
G-002	0.23	0.00	0.00	68	18	50	-74	391	107	56	333
G-003	0.22	0.00	0.00	207	133	74	-36	995	663	258	1286
G-004	0.22	0.00	0.00	168	86	82	-49	880	472	167	916
G-005	0.22	0.00	0.00	207	63	144	-70	1045	334	212	1122
G-006	0.22	0.00	0.00	255	128	127	-50	1250	638	599	2987
G-007	0.25	0.00	0.00	84	39	45	-54	368	177	110	500
G-008	0.24	0.00	0.00	291	178	113	-39	1323	823	687	3176
G-009	0.48	0.00	0.00	868	300	568	-65	1977	719	1042	2496
G-010	0.48	0.00	0.00	526	388	138	-26	1166	852	893	1962
G-011	0.25	0.02	0.00	398	467	69	17	1716	2074	1022	4539
G-012	0.25	0.01	0.00	361	455	94	26	1563	2043	843	3786
G-013	0.24	0.00	0.00	117	104	13	-11	500	458	115	507
G-014	0.33	0.00	0.00	73	27	46	-63	235	85	59	186
G-015	0.22	0.00	0.00	71	47	24	-34	341	225	89	426
G-016	0.25	0.00	0.00	69	32	37	-54	300	146	109	497
G-017	0.25	0.00	0.00	190	76	114	-60	844	364	214	1025
G-018	0.14	0.00	0.00	143	19	124	-87	1100	142	43	320
G-019	0.45	0.01	0.00	323	242	81	-25	810	581	1378	3308
Total	5.17	0.04	0.00	4485	2821	1664				7941	
Average		0.00	0.00	236	148			901	579	418	1557


MM2x2 APEX

Grid	ApA	ApA	RI Density Areas	RI Density Areas
G-001	311	93	Medium	Low
G-002	391	107	Medium	Low
G-003	995	663	High	Medium/High
G-004	880	472	Medium/High	Medium
G-005	1045	334	High	Medium
G-006	1250	638	High	Medium/High
G-007	368	177	Medium	Low
G-008	1323	823	High	Medium/High
G-009	1977	719	High	Medium/High
G-010	1166	852	High	Medium/High
G-011	1716	2074	High	High
G-012	1563	2043	High	High
G-013	500	458	Medium	Medium
G-014	235	85	Low/Medium	Low
G-015	341	225	Medium	Low/Medium
G-016	300	146	Medium	Low
G-017	844	364	Medium/High	Medium
G-018	1100	142	High	Low
G-019	810	581	Medium/High	Medium