

# 2004 LASER RANGEFINDER SURVEY

MANUFACTURER/DISTRIBUTOR	Laser Atlanta LLC	Laser Technology Inc.	Laser Technology Inc.	Laser Technology Inc.	LaserCraft Inc.	LaserCraft Inc.
<b>MODEL</b>	Advantage CI	Impulse 200 [1]	Impulse 200LR	Impulse XL	Contour XLRic	Contour XLRI
<b>U.S. SUGGESTED LIST PRICE</b>	\$2,999	\$2,895 [2]	\$3,395 [2]	\$3,395 [2]	\$3,995	\$2,995
<b>COMPANY PHONE NUMBER</b>	770/446-3866	303/649-1000	303/649-1000	303/649-1000	770/409-9660	770/409-9660
<b>AIMING, DISPLAY, MEASUREMENT</b>						
Device for aiming at target (telescope or heads-up display)	HUD	Scope	Scope	Scope	HUD	HUD
Illumination for observing aiming point in low or no light environments?	None	Red dot	Red dot	N/A	Yes	Yes
Type of laser (Type I, II, etc.)	Type 1	Type 1	Type 1	Type 1	Type 1	Type 1
Certifications for device (UL, ISO, etc.)	FDA Class 1	ISO, CE	ISO, CE	ISO, CE		
Laser device, wavelength, color (e.g., laser diode, 940 nm, infrared, with visible laser for pointing only)	Infrared laser	[8]	[8]	[8]	[1]	[1]
Reflectorless?	Yes	Yes	Yes	Yes	Yes	Yes
Measurement time (reflectorless and with reflector, if different) (in seconds)	0.33	0.33	0.33	0.33	[2]	[2]
Range to Kodak Gray Card (gray side) (ft/m)	2000 ft	300 ft	600 ft	600 yds	1000+ ft	1000+ ft
Range to Kodak Gray Card (white side) (ft/m)	2500 ft	450 ft	900 ft	900 yds	3200+ ft	3200+ ft
Range accuracy (RMS or std. dev.) (±x ft/±y m)	2 in or 5 cm	± 0.2	± 0.2	± 1 yd or 1 m	[3]	[3]
Range resolution (ft/m)	.01 ft	0.01 ft/0.01 m	0.01 ft/0.01 m	± 1 ft or 1 m		
Range repeatability (ft/m)	.02 ft	0.05 ft	0.05 ft	± 1 yd or 1 m	± 0.5 ft	± 0.5 ft
Number of measurement pulses per measurement	238	40	40	40	[4]	[4]
Software for eliminating false measurements from foreground clutter?	Yes, obstructed mode	Yes, built-in	Yes, built-in	Yes, built-in	Yes	Yes
If yes, can the range of measurements to be ignored be set by the user?	Yes, obstructed mode	Yes	Yes	Yes	No	No
Error checking for intermittent obstructions, etc.?	Yes	Yes	Yes	Yes	Yes	Yes
Device for outputting measured or calculated data to observer (LCD screen, LEDs, heads-up display)?	RS232 link	LCD screen	LCD screen	LCD screen	LCD and HUD	LCD and HUD
Does the instrument have a telescope or heads-up display so that measurement results and key status indicators are visible while sighting the target?	Yes	No	No	No	HUD standard; monocular option	HUD standard; monocular option
Illumination for observing display in low or no light environments?	Yes	Yes	Yes	Yes	Yes	Yes
<b>SOFTWARE AND ADVANCED MEASUREMENTS</b>						
Available with inclinometer (tilt or vertical angle sensor)? (Yes, no, or in tripod only)	Yes	Yes, tilt	Yes, tilt	Yes, tilt	Yes	Yes
Range of tilt in which inclinometer operates (±xyz°)	± 50°	± 90°	± 90°	± 90°	± 40°	360°
Precision (least count) of inclinometer (0.x° or 0.y')	± 0.4°	0.01°/grad	0.01°/grad	0.01°/grad	0.1	0.1
Available with azimuth detection? (Yes or No)	Yes	No, optional	No, optional	No, optional	Yes	No
Compass for automatic azimuth detection available or included? (Available or included as standard)	Included	Available	Available	Available	Standard	N/A
Accuracy of inclinometer (RMS or standard dev.) (±x°)	0.4 RMS	± 0.1°	± 0.1°	± 0.1°	0.4 @ > 20°	0.1
Repeatability of inclinometer measurements (±y°)	0.4	± 0.05°	± 0.05°	± 0.05°	0.2° typical	0.2° typical
Range in which compass operates (e.g., 0-369.99 degrees)	0 to 359.99°	0 to 359.99°	0 to 359.99°	0 to 359.99°	[5]	N/A
Precision (least count) of compass (0.x° or 0.y')	0.1	0.01°/grad	0.01°/grad	0.01°/grad		
Accuracy of compass (RMS or standard dev.) (±x°)	± 1° RMS	± 0.3°	± 0.3°	± 0.3°	± 0.5°	N/A
Repeatability of compass measurements (±y°)	0.3	± 0.1°	± 0.1°	± 0.1°	0.1°	N/A
Onboard software for applications available as standard or optional selections? (Yes or No)	No	Yes	Yes	Yes	No	No
Is the software optional or is software available that expands the standard application software for use with this product in the field? (Yes or No)	Yes	Yes, optional/available	Yes, optional/available	Yes, optional/available	N/A	N/A
Applications supported (list):		[9]	[9]	[9]		
Support indirect measurements? E.g. distance-distance, azimuth-azimuth or distance-azimuth calculations?	Yes	Yes	Yes	Yes	Yes	Yes
When in reflectorless mode, is the valid range selectable to eliminate false readings from other objects approximately in line?	Yes	Yes	Yes	Yes	Yes	Yes
Compatible with GPS systems? (If yes, please list.)	[1]	Yes [3]	Yes [3]	Yes [3]	[6]	[6]
Compatible with data recorders (If yes, please list.)	Yes	Yes [4]	Yes [4]	Yes [4]	[6]	[6]
Compatible with GIS mapping systems? (If yes, please list.)	Yes	Yes [5]	Yes [5]	Yes [5]	Yes	Yes
Compatible with CAD software (in field computers)? (If yes, please list.)	Yes	Yes [6]	Yes [6]	Yes [6]		
Support output of electronic measurement or calculated data to external device?	Yes	Yes	Yes	Yes	Yes	Yes
Is data transferred automatically or at the press of a key or other command?	Automatically	Both	Both	Both	Either	Either
Type of data transmission protocols supported (such as RS232C)	RS232	RS232 serial	RS232 serial	RS232 serial	RS232	RS232
Is data transmission two-way so that, if desired, measurement and calculations can be commanded from external device?	Yes	Yes	Yes	Yes	Yes	Yes
Distance units supported (m, ft, in OR cu yds, cu ft, cu m)	[2]	m, ft, degrees, grads	m, ft, degrees, grads	m, yds, degrees, grads	[7]	[7]
<b>OTHER CHARACTERISTICS</b>						
Battery type (NiCd, NiMH, alkaline, etc.)	NiMH	Alkaline; NiCD rechargeable	Alkaline; NiCD rechargeable	Alkaline; NiCD rechargeable	NiMH	NiMH
Works with optional external battery?	Yes	No	No	No	Yes	Yes
Types of external batteries supported	NiMH	N/A	N/A	N/A	9-18 VDC	9-18 VDC
Number of measurements with each battery type, including standard battery at 1 measurement/30 seconds	Will operate all day	2400	2400	2400	640	640
Average power consumption when taking a measurement every 30 seconds (0.x amps at Y volts or Z watts)	250 milliamps	150 milliamps @ 3 volts	150 milliamps @ 3 volts	150 milliamps @ 3 volts	2.8 watts	2.8 watts
Adapters, transformers and cables available for use with non-standard batteries? (If yes, state which.)	Yes, adapter	N/A	N/A	N/A	Adapters	Adapters
Battery charging time (in hours)	2	N/A	N/A	N/A	2	2
Warranty	1 year	1 year	1 year	1 year	1 year	1 year
Weight including battery but excluding accessory devices such as compasses, cables, etc.	4.8 lbs	2.2 lbs	2.2 lbs	2.2 lbs	[8]	1.6 kg (3.5 lbs)
Dimensions (in/cm) (WxHxD)	[5]	2.5 x 5 x 6 in	2.5 x 5 x 6 in.	2.5 x 5 x 6 in.	7.4 x 4.25 x 10 in	7.4 x 4.25 x 10 in
Type of case provided, how much room for accessories provided (and which)	Soft case	Carrying case w/ room	Carrying case w/ room	Carrying case w/ room	[9]	[9]
Primary material used for instrument's case	Lex ABS	Ballistic nylon w/ frame	Ballistic nylon w/ frame	Ballistic nylon w/ frame	Padded, watertight polypropylene	Padded, watertight polypropylene
Drop resistance (e.g. survives 2 m drop to asphalt)	Yes	[10]	[10]	[10]	1 m drop to asphalt	1 m drop to asphalt
Shock/vibration resistance	Yes	MIL	MIL	MIL		
Operating temperature range	[3]	-22 to 140° F	-22 to 140° F	-22 to 140° F	-30 to 60° C	-30 to 60° C
Water resistance (IP ratings)	IP54	IP67	IP67	IP67	IP67	IP67
Dust resistance (IP ratings)	IP54	IP67	IP67	IP67	IP67	IP67
<b>AVAILABLE ACCESSORIES</b>						
Monopole	Yes	Yes	Yes	Yes	N/A	N/A
Monocular (state power and whether field detachable)	8X monocular scope	[11]	[11]	[11]	Yes, 8X	Yes, 8X
Fast battery charger	Smart charging station	N/A	N/A	N/A	Standard	Standard
Tripod	Yes	Yes	Yes	Yes	N/A	N/A
Tripod with inclinometer and compass (if available, state details if more accurate than onboard system, power requirements, etc.)	[4]	N/A	N/A	N/A	N/A	N/A
<b>Additional Features</b>		[7]			[10]	[10]
<b>Reader Service Number</b>	1	2	3	4	5	6

# 2004 LASER RANGEFINDER SURVEY

MANUFACTURER/DISTRIBUTOR	LaserCraft Inc.	Leica Geosystems	Leica Geosystems	Measurement Devices Limited	Riegl USA	Riegl USA
<b>MODEL</b>	Contour XLR	Laser Locator	Laser Locator+	LaserAce 300	FG21 HA	FG21 LR
<b>U.S. SUGGESTED LIST PRICE</b>	\$2,695	\$7,900	\$12,900	\$2,730	\$6,750	\$6,750
<b>COMPANY PHONE NUMBER</b>	770/409-9660	800/367-9453	800/367-9453	281/646-0050	407/248-9927	407/248-9927
<b>AIMING, DISPLAY, MEASUREMENT</b>						
Device for aiming at target (telescope or heads-up display)	HUD	[1]	[1]	illuminated red dot	HUD	HUD
Illumination for observing aiming point in low or no light environments?	Yes	[2]	[2]	See above	No	No
Type of laser (Type I, II, etc.)	Type 1	Class 1 eye safe	Class 1 eye safe	GaAs laser diode	Class 1 eye safe	Class 1 eye safe
Certifications for device (UL, ISO, etc.)				[6]		
Laser device, wavelength, color (e.g., laser diode, 940 nm, infrared, with visible laser for pointing only)	[1]	IR diode 860 nm	IR diode 1550 nm	905 nm	Laser diode 904 nm	Laser diode 904 nm
Reflectorless?	Yes	Yes	Yes	[1]	Yes	Yes
Measurement time (reflectorless and with reflector, if different) (in seconds)	[2]	< 1 second	< 1 second	0.3 second	[1]	[2]
Range to Kodak Gray Card (gray side) (ft/m)	1000+ ft	[19] [20]	[19] [20]	N/A	400 m/800 m selectable	1200 m
Range to Kodak Gray Card (white side) (ft/m)	3200+ ft	[3] [19]	[15] [19]	N/A	600m/1200 m selectable	2000 m
Range accuracy (RMS or std. dev.) (±x ft/±y m)	[3]	± 1 m	[16]	Typically 10 cm	5 cm/10 cm selectable	0.2 m
Range resolution (ft/m)		[4]	[17]	0.1 cm	1 cm/5 cm	0.1
Range repeatability (ft/m)	± 0.5 ft			N/A		
Number of measurement pulses per measurement	[4]			N/A		
Software for eliminating false measurements from foreground clutter?	Yes	Yes	Yes	Yes	Yes	Yes
If yes, can the range of measurements to be ignored be set by the user?	No	Yes	Yes	No	Yes	Yes
Error checking for intermittent obstructions, etc.?	Yes	Yes	Yes	No	Yes	Yes
Device for outputting measured or calculated data to observer (LCD screen, LEDs, heads-up display)?	LCD and HUD	In-view LED, RS232 port	In-view LED, RS232 port	RS232C	HUD	HUD
Does the instrument have a telescope or heads-up display so that measurement results and key status indicators are visible while sighting the target?	HUD standard; monocular option	Yes	Yes	No	Yes	Yes
Illumination for observing display in low or no light environments?	Yes	Yes	Yes	Yes, automatic sensor	No	No
<b>SOFTWARE AND ADVANCED MEASUREMENTS</b>						
Available with inclinometer (tilt or vertical angle sensor)? (Yes, no, or in tripod only)	No	Yes, standard	Yes, standard	Yes, built-in	Yes	Yes
Range of tilt in which inclinometer operates (±xyz°)	N/A	-45 to 45°	-45 to 45°	-90 to 90°	60 to -30°	60 to -30°
Precision (least count) of inclinometer (0.x° or 0.y' )		10 mil, 1", 1 gon	10 mil, 1", 1 gon	0.1°	0.1°	0.1°
Available with azimuth detection? (Yes or No)	No	Yes, standard	Yes, standard	Yes	No	No
Compass for automatic azimuth detection available or included? (Available or included as standard)	N/A	Yes, standard	Yes, standard	[2]	No	No
Accuracy of inclinometer (RMS or standard dev.) (±x°)	N/A	± 0.2°, ± 3 mils	± 0.2°, ± 3 mils	0.3° at 0°	N/A	N/A
Repeatability of inclinometer measurements (±y°)	N/A					
Range in which compass operates (e.g., 0-369.99 degrees)	N/A	360°	360°	360°		
Precision (least count) of compass (0.x° or 0.y' )				0.1°		
Accuracy of compass (RMS or standard dev.) (±x°)	N/A	± 0.6°, ± 10 mils	± 0.6°, ± 10 mils	Typically better than 1°		
Repeatability of compass measurements (±y°)	N/A			N/A		
Onboard software for applications available as standard or optional selections? (Yes or No)	No	Yes	Yes	Yes, standard	Yes	Yes
Is the software optional or is software available that expands the standard application software for use with this product in the field? (Yes or No)	N/A	No	No	[3]	Yes	Yes
Applications supported (list):			[5]	Forestry, blast face profiling.		
Support indirect measurements? E.g. distance-distance, azimuth-azimuth or distance-azimuth calculations?	Yes	Yes	Yes	Yes	No	No
When in reflectorless mode, is the valid range selectable to eliminate false readings from other objects approximately in line?	Yes	No	No	No	Yes	Yes
Compatible with GPS systems? (If yes, please list.)	[6]	[6]	[6]	Yes	No	No
Compatible with data recorders (If yes, please list.)	[6]			Yes	Yes	Yes
Compatible with GIS mapping systems? (If yes, please list.)	Yes	[7]	[7]	Yes, multiple products		
Compatible with CAD software (in field computers)? (If yes, please list.)				Yes, multiple products	Yes, Carlson, TDS	Yes, Carlson, TDS
Support output of electronic measurement or calculated data to external device?	Yes	Yes	Yes	Yes	Yes, RS232	Yes, RS232
Is data transferred automatically or at the press of a key or other command?	Either	Yes	Yes	Automatic when laser fired	Yes, selectable	Yes, selectable
Type of data transmission protocols supported (such as RS232C)	RS232	RS232 unidirectional	RS232 unidirectional	RS232C, 4800 or 9600 Baud	RS232	RS232
Is data transmission two-way so that, if desired, measurement and calculations can be commanded from external device?	Yes	No	No	Yes	Yes	Yes
Distance units supported (m, ft, in OR cu yds, cu ft, cu m)	m, ft, yds	m, yds, ft	m, yds, ft	m and ft	m, yds, ft	m, yds, ft
<b>OTHER CHARACTERISTICS</b>						
Battery type (NiCd, NiMH, alkaline, etc.)	NiMH	[8]	[8]	2x AA alkaline cells	Yes, multiple	Yes, multiple
Works with optional external battery?	Yes	No	No	No	Yes, multiple	Yes, multiple
Types of external batteries supported	9-18 VDC	N/A	N/A	N/A	Yes, multiple	Yes, multiple
Number of measurements with each battery type, including standard battery at 1 measurement/30 seconds	640	[9]	[9]	± 720	2000> alkaline	2000> alkaline
Average power consumption when taking a measurement every 30 seconds (0.x amps at Y volts or Z watts)	2.8 watts			[4]		
Adapters, transformers and cables available for use with non-standard batteries? (If yes, state which.)	Adapters			No	Yes, multiple	Yes, multiple
Battery charging time (in hours)	2			N/A		
Warranty	1 year	1 year	1 year	1 year	1 year	1 year
Weight including battery but excluding accessory devices such as compasses, cables, etc.	1.36 kg (3 lbs)	1.71 kg	1.71 kg	600 gm	1.45 kg	1.45 kg
Dimensions (in./cm) (WxHxD)	7.4 x 4.25 x 10 in	226 x 178 x 82 mm	227 x 178 x 82 mm	175 x 106.5 x 56 mm	185 x 120 x 60	185 x 120 x 60
Type of case provided, how much room for accessories provided (and which)	[9]	[10]	[10]	Soft canvas, space for compass	Heavy plastic - all	Heavy plastic - all
Primary material used for instrument's case	Padded, watertight polypropylene	Padded grey nylon	Padded grey nylon	Reinforced polycarbonate	Plastic	Plastic
Drop resistance (e.g. survives 2 m drop to asphalt)	1 m drop to asphalt	[11]	[11]	N/A	Yes	Yes
Shock/vibration resistance	[12]	[12]	[12]	N/A	IEC 68 2 6	IEC 68 2 6
Operating temperature range	-30 to 60° C	-35 to 63° C	-35 to 63° C	-10 to 45° C	-10 to 50° C	-10 to 50° C
Water resistance (IP ratings)	IP67	[18]	[18]	IP65	IP64	IP64
Dust resistance (IP ratings)	IP67			IP65	IP64	IP64
<b>AVAILABLE ACCESSORIES</b>						
Monopole	N/A	No	No	Yes	Yes	Yes
Monocular (state power and whether field detachable)	Yes, 8X	No, binoculars built-in	No, binoculars built-in	Built-in	6 x 30 multilayer	6 x 30 multilayer
Fast battery charger	Standard	No	No	N/A	Yes	Yes
Tripod	N/A	No, binoculars	No, binoculars	Yes	Yes	Yes
Tripod with inclinometer and compass (if available, state details if more accurate than onboard system, power requirements, etc.)	N/A	[13]	[13]		No	No
<b>Additional Features</b>	[10]	[14]	[14]	[5]		
<b>Reader Service Number</b>	7	8	9	10	11	12

# 2004 LASER RANGEFINDER SURVEY NOTES

## Laser Atlanta LLC

1. Leica, Trimble, Ashtech, Sokkia, Thales, TDS Recon, etc.
2. m, ft, yards, sq m, sq ft, sq yard
3. Minus 30 degrees to 140 degrees F
4. Yes: dual, vertical, horizontal encoding tripods
5. (LxWxH) 8.4 x 4.5 x 7.5 in

## Laser Technology

1. Several models: Impulse 100, Impulse 200LR, Impulse 200XL; Impulse 2K
2. MSRP Range from \$1995.00 - \$3595.00
3. GPS - Trimble, Leica, Ashtech, Sokkia
4. Data Recorders - TDS: Ranger, Recon; HP 48GX; iPaq; Trimble TSC1, TCSe; DAP; Allegro
5. GIS Mapping - Thales/Ashtech Reliance & Z; Trimble Asset Surveyor, ASPEN, TerraSync & Survey Controller; ESRI ArcPad; Novatel Out-ride; PenMap; Pocket GIS
6. ESRI, AutoCAD
7. Optional angle encoder, accurate to 0.01 degrees, onboard solutions
8. Laser diode, 904 nm, infrared, pulse
9. Missing line, distance difference, cumulative, height
10. With carrying case survives 2 m drop to asphalt
11. Optional 1.5 to 4X zoom not field detachable

## LaserCraft Inc.

1. Laser diode, 905 nm, infrared
2. Available in 0.3 sec or 5 mS
3. 0.1 m to a white target @ 85 m
4. 60/ 0.3 second or 1/ 5 mS

5. 50 to 130°, 90 being horizontal
6. Yes, Trimble, Leica, Sokkia, CMT, Thales
7. m, ft, yds, sq m, sq yd, sq ft
8. 1.6 kg (3.5 lbs) compass built-in
9. Hard carrying case, mounting assembly, 2 batteries, cables
10. Tripod mounting yoke assembly; Bluetooth-enabled

## Leica Geosystems

1. Binoculars with in-view aiming mark
2. Yes, red LED square aiming mark
3. 25 m to 1500 m at 10 km visibility
4. 0.5 m -999.5 m, others 1 m
5. Distance measurement (slope distance), multiple object measurement, combined measurement with data transfer (distance, azimuth, inclination), horizontal distance and height difference between your position and a remote object, horizontal and vertical distance between two objects, azimuth measurement, combined azimuth and inclination angle measurement, azimuth and distance between two objects, relative horizontal and vertical angle
6. Yes, Leica GPS System 500, Leica GPS System 1200, Leica GS20 GPS/GIS Handheld
7. Leica GS20 GPS/GIS Handheld
8. 6V lithium battery (Type 2CR5)
9. > 2000 measurements, low battery indicator
10. Soft carrying case with neck strap and belt loop (accessories include binocular eyepiece cover, binocular neck strap, battery, interface cable (optional))
11. Impact-resistant rubber armour casing

12. 30 g / 11 ms / xyz axes, 10 to 500 Hz for 10 minutes
13. No, compass and inclinometer built-in
14. Optional data transfer cable for DB9 connection or GPS
15. Up to 4000 m at 20 km visibility
16. ±1 m (50 m - 2000 m), ±2 m (>2000 m)
17. 0.5 m to 999.5 m, others 1 m
18. Immersion proof, 10 min. in 1 m depth of water
19. Leica does not state range reference against Kodak cards. Range statements are against reflectorless objects in the real user environment, at a given visibility.
20. Theoretical max: 2500 m

## MDL

1. Up to 300 m; reflectors to 5 km
2. Digital 3 axis fluxgate, available optional extra
3. Yes, available onboard expanded application software
4. 3v DC 350mA (standby 20mA)
5. Horizontal angle encoder, accuracy 0.2°, resolution 0.1°, power 6x AA cells, wide selection of accessories
6. Class 1 CENELEC EN60825

## Riegl USA

1. 0.1 to 1 second selectable
2. 0 to 1 second self-adapting

POB does not assume responsibility for any errors or omissions that may be contained within the survey.

## ACCUPOINT INC.

CONSTRUCTION & SURVEY SUPPLY



### RENTAL RATES

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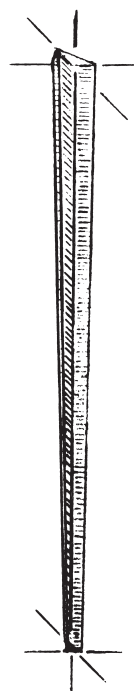
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