

**CITY OF WILLMAR, MINNESOTA  
REQUEST FOR COMMITTEE ACTION**

**Agenda Item Number:** \_\_\_\_\_

**Meeting Date:** February 11, 2014

**Attachments:**  Yes  No

**CITY COUNCIL ACTION**

**Date:**

- Approved       Denied  
 Amended       Tabled  
 Other

**Originating Department:** Willmar Police Department

**Agenda Item:** Accept donation of a new LIDAR unit.

**Recommended Action:**

Make a motion to accept the donation at committee level and move to Council for final approval as a resolution to accept the donation of a Stalker XLR LIDAR unit.

**Background/Summary:** The Willmar Police Department participates in a traffic enforcement grant known as TZD. The City Council approved department participation in this grant through resolution #8 on June 4, 2012.

Grant managers provide periodic reward incentives for stellar participation efforts. The Willmar Police Department is being offered one of those rewards in the form of a new "Stalker XLR" Lidar unit which has an approximate value of approximately \$2500.00. LIDAR is essentially a laser speed detection and measuring device used for the same purposes as a radar device with the exception that radar operates on sound wave principal and LIDAR operates under light principal. There would be no cost to the department for the device.

**Alternatives:** Deny the offered donation.

**Financial Considerations:** None.

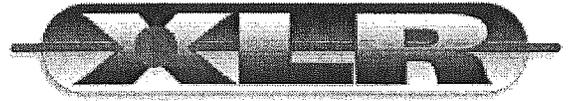
**Preparer:** Chief of Police David Wyffels

**Signature:** *David J. Wyffels*

**Comments:** Documentation attached identifying the type of donated item.



# Stalker's new XLR LIDAR. Small size. Big Performance.



## X-SERIES LONG RANGE

Small, lightweight, and powerful.  
Superior range, fast target acquisition,  
and solid tracking.

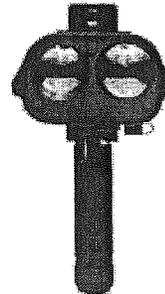


- Small and Lightweight
- Fastest acquisition time
- Industry-leading range and accuracy
- Removable, high capacity, Li-Ion rechargeable battery handle
- Ergonomic, waterproof design
- Speed *and* distance in Heads-Up Display

**Smallest hand-held LIDAR**  
(gun type) on the market today

**Lightest hand-held LIDAR**  
(gun type) on the market today

High powered optics.  
Polymer housing is impact  
resistant and waterproof.



Removable, high capacity  
battery handle - power  
for several shifts.



**Small. Light. Powerful. Stalker.**

**STALKER**® Radar | Lidar

*The World Leader in Speed Measurement*



**800-STALKER**

**StalkerRadar.com**

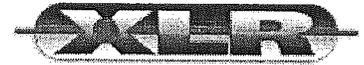
Simple, intuitive, easy-to-use single button controls.



HUD Light switch - allows operator to increase or decrease with a single button the HUD intensity for proper viewing in all lighting conditions.

MODE switch - allows operator to select speed and range, range only, speed only, or single-shot with a single button.

Audio switch - single-button to increase or decrease the audio tone.



## Specifications

<b>Dimensions:</b>	8.9" Height, 4.7" Length, 4.7" Width (22.6 cm Height, 11.9 cm Length, 11.9 cm Width)
<b>Weight:</b>	Including Battery Handle - 2.3 lbs (1.04 kg)
<b>Housing:</b>	High impact resistant polymer housing
<b>Environmental:</b>	-22° to +140° F, operating -40° to +185° F, non-operating
<b>Humidity Protection:</b>	+99° F, 90% Relative Humidity
<b>Battery Life:</b>	Typically 500+ charge cycles
<b>Battery Charge:</b>	Li-ion battery: Approx. 2 - 3 shifts
<b>Type:</b>	Handheld LIDAR offering Tracking mode, Single-Shot mode, and Time/Distance mode.
<b>Acquisition Time:</b>	Less than 0.4 second
<b>Nominal Range</b>	
<b>LIDAR XLR:</b>	Minimum: - Range mode < 10 (< 3 m) Speed mode 45 feet (113.7 m) Normal: 2500 feet (762 m) approaching Targets Maximum: > 4,000 feet (1200 m)
<b>Range Accuracy:</b>	less than 1 ft., typical +6" (0.15 m)
<b>Speed Measure:</b>	1 mph to 299 mph (2 km/h to 481 km/h, 2 knots to 344 knots)
<b>Speed Accuracy:</b>	± 1 mph (± 1 km/h, ± 1 knots)
<b>Time/Dist. trigger mode:</b>	Separate trigger depressions when target enters and exits speed zone.
<b>Remote Trigger:</b>	Remote trigger signal available through I/O Port.
<b>Target Speed Tone:</b>	Variable audio tone corresponding to target speed.
<b>Target Return Tone:</b>	No tone when beam is off target; tone repetition increases as beam moves into target and return signal quality increases.
<b>Switching Output:</b>	I/O Port signal for operation of external devices (e.g. a camera). Toggles when speed exceeds speed signal setting. (special order only)
<b>Operating Wavelength:</b>	905 ± 10 nm Peak @ 25° C
<b>Eye Safety:</b>	FDA/CDRH CLASS 1M Laser Device (Eyesafe)
<b>Power Output:</b>	50 uW maximum average power. (385 nJ maximum pulse energy) (meets FDA/CDRH regulations)
<b>Pulse Width:</b>	< 30 nsec.
<b>Beam Divergence:</b>	< 3 mrad FWHM. 3 feet x 3 feet @1000 feet (.9 meters x .9 meters @ 304.8 meters)

The Stalker X-Series LIDAR are the smallest and lightest hand-held, gun-type lasers on the market today. At a mere 2.3 lbs. including removable/rechargeable battery handle, the X-Series may be lightest of all the hand-helds, but it's no lightweight. The new snap-in Li-Ion battery handle provides ample power to last two or more shifts. Plus, the battery can be expected to last through more than 500 charging cycles.

Target acquisition is under 0.4 seconds. The X-Series Long Range (XLR) is the best choice for targets as far as 4,000 feet away.

### Single-Shot and Continuous Tracking Modes

The X-Series LIDARs have the ability to operate in three modes: single-shot, continuous tracking, or constant trigger-down mode. This allows the operator to select the mode which best suits their needs.

### Weather/Obstruction Mode

The X-Series units have, as standard, a Weather/Obstruction mode which allows the unit to work in rain, snow, blowing dust, fog, as well as through fences, tree branches, etc. This also increases the operating distance when using the X-Series LIDARs through the front windshield of the patrol car.

### Enhanced Tracking

The X-Series LIDARs have the ability to track a moving target through small obstructions such as a pole or parked vehicle.

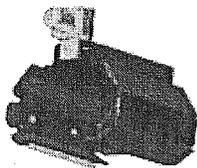
### Doppler-Type Audio Tracking

Since most laser operators also operate radar, the X-Series LIDARs generate a continuous Doppler-type audio tone which correlates to the target speed. Just like the audio on a police radar, this audio is a substantial aid to understanding and building a target tracking history - providing a better evidentiary case for citations.

### Accessories

#### Holster

Heavy gauge steel with padded interior and keyed lock keeps LIDAR safe and secure.



Exclusive speed **and** distance in the Heads-Up Display

### Lowest Cost of Ownership

Stalker products are priced competitively and built to last. But should your X-Series LIDAR ever need repair, you can count on a fair price based on your LIDAR's specific needs, not a one-charge-fixes-all blanket price. That's what we mean when we say that Stalker has the lowest cost of ownership in the industry.

# STALKER® Radar | Lidar

The World Leader in Speed Measurement

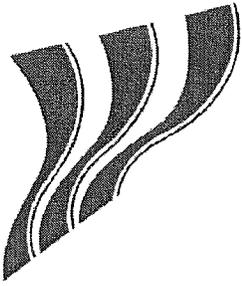
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**Originating Department:** Willmar Police Department

**Agenda Item:** Archery Range Safety Planning

**Recommended Action:** Continue discussion on safe archery range considerations for City Council.

**Background/Summary:** This item was discussed at the January 14, 2014 meeting. Due to time constraints, it was requested to bring it back to this meeting from a previous agenda for further discussion. Council Members have previously been provided copies of past plans and suggested processes.

**Alternatives:** Table the item and discussion until a future date.

**Financial Considerations:** None

**Preparer:** David Wyffels

**Signature:**

*David / Wyffels*

**Comments:**

DATE: February 6, 2014

TO: Public Works / Public Safety Committee

FROM: Chief of Police David Wyffels

The information below is provided to assist you in your decision making relating to the defining of archery range safety standards. The language below is taken directly from the National Field Archery Association publication.

I have removed language that does not relate to range safety to reduce the amount of material you need to review thereby condensing the original 23 page document down to these few pages.

Thank you.

## **National Field Archery Association (NFAA)**

### **SECTION II: OUTDOOR RANGE LAYOUT AND SIZE REQUIREMENTS**

#### **II.A. General**

Safety is the overwhelming factor dictating range size. The actual shooting lane dimensions account for only a very small fraction of the total area requirement. Terrain is also quite important, especially in the layout of field and bowhunter ranges. Proper use of terrain can alleviate many safety concerns, particularly in providing natural backstops and buffers.

#### **II.B. Field Archery Range**

The NFAA has four size-related guidelines for laying out a field range (the IFAA's requirements are similar, but not as definitive):

- ◆ If the target is not backstopped (either fabricated or earthen), 25 yards or one-half of the target distance, whichever greater, shall be cleared behind the butt. [Note: This guideline was formulated in the recurve era. Today, it is suggested that "more-the-better."]
- ◆ A minimum clearance of 25 to 50 (safest) feet, depending on terrain and target distance, shall be provided between any path or shooting lane paralleling another shooting lane. Fifteen yards (45 feet) is a good compromise.
- ◆ The distance on each side of the target butt shall be greater than the target distance times the tangent of 15° to 30° (safest), depending on terrain and target distance. As a compromise, the tangent of 26.5° is 0.5, making it easy to "stake out" while surveying the range.

For example, the safety zone on either side of a 40-yd target butt is  $40 \times \tan(26.5^\circ) = 40 \times 0.5 = 20$  yards. The buffer zone behind this 40-yd butt would therefore be 25 yards deep by 40 (20 + 20) yards wide. This

means that no waiting area or shooting position should be closer than 25 yards from a 40-yd target butt. See below for examples of other target distances.

◆ The target lanes must be sufficiently wide to support two archers shooting simultaneously side-by-side. Four-wide is highly recommended for the longer walk-up targets, which always seem to take longer to shoot.

In summary, and for initial range layout planning, the recommended safety zones to **each side** and **behind** field archery target butts are:

Target Distance	Half Width at Butt	Depth behind Butt
Up to 30 yds	15 yds	25 yds
30 to 50 yds	One-half target distance	25 yds
50 to 80 yds	One-half target distance	One-half target distance

The foregoing safety guidelines assume that in no case should an errant arrow cross the range boundary, even if the adjoining property is uninhabited. In other words, all the safety buffer zones must be included *within* the total range area requirements.

### II.C. Target Archery Range

Outdoor target archery range size requirements are easy to define because:

1. terrain is not a factor, and
2. all targets are walk-backs.

Factors relating to a "first class" outdoor target range layout are:

- The ground should be flat, free of obstructions.
- Each shooting lane should be no narrower than 10 feet or about 3 yards.
- Safety (buffer) lanes along the side boundaries should be no less than 15 yards.
- The safety area behind the target at the longest distance should be no less than 40 yards.
- Five yards minimum is recommended behind the shooting line.

### II.D. Bowhunter Range

As with field archery ranges, the actual land area required between the shooting stakes and targets is a small fraction of the total bowhunter range area required. Although the distances shot on a bowhunter range average less than those shot on a field range, there are several factors which make the total area requirements greater:

- Arrow speed as well as the probability of arrow ricochet are higher for the bowhunter than for the field archer, and since fabricated backstops are not desired (for the sake of realism), the *safety zones should be at least twice the size suggested for a field range*. Earthen backstops, however, either manmade or natural, will help quite a bit.
- Paths to and from the target should never be along the sight-line between the shooting stake and target.

- In summary, a rough estimate of the land area required for a bowhunter range is 50% more per target than for a field range. A typical field range requires about an acre per target; therefore, a typical unmarked bowhunter range needs about *1½ acres per target*. Therefore, a 20-target range needs *30 acres minimum*. The more the better, however.

### SECTION III: OUTDOOR TARGET BUTT AND BACKSTOP CONSTRUCTION

#### III.A. Field Archery

The minimum size requirements for field archery butts are based on the target faces being shot. For example, the following table relates butt dimensions with target configuration:

Distance	Critical Tangent	Minimum Butt Dimensions
Up to 15 yds	4 x 4 – 20-cm	36" x 36"
15 to 30 yds	2 x 2 – 35-cm	30" x 30"
35 to 40 yds	1 x 2 – 50-cm	30" x 42"
40 to 80 yds	Group 1 Animal	42" x 42"

Considering that a compressed bale of excelsior is about 15" x 15" x 42", two-bale butts are barely adequate for field targets from 15 to 40 yards (assuming no vertical Group 1 Animals). Butts three bales high are required for the "snake eyes" and all target distances 40 yards and greater. Butts four feet square are amply sized for both field and target archery.

It wasn't too long ago that excelsior was the most common target butt material. Today, however, there are literally hundreds of different materials available worldwide, including various fibrous natural materials, forest or agricultural by-products, bundled rags and recycled plastic, but mostly a wide variety of the more expensive castable or moldable foams and composite materials. Moreover, the trend seems to be toward the purchase of commercial, full-sized, pre-fabricated, target butts.

A medium cost compromise is the do-it-yourself fabrication using cardboard, insulation board, or any one of many sheet foam materials, stacked and compressed in a custom made screw-down frame.

Foams have several advantages: (1) they're available in a variety of thicknesses and densities, (2) they can be cut to any size or shape, and (3) they're both weather-proof and varmint-proof. Unfortunately, some foams have great "grabbing power," making it difficult to extract the arrows; plus, some foams tend to "goop up" arrow shafts, especially those made of composite materials.

Although the target butt may be waterproof, ordinary paper target faces need protection from the rain, especially if they're to be shot more than one day. A simple roof over the butt will suffice. The roof should be a little higher than six feet from the ground (to allow for head clearance), and about four feet wide.

Unlike indoor archery, there is no minimum height above the ground for field archery target faces.

As noted above, unnatural target backstops are not desired on a field archery range unless dictated by safety concerns. Besides, fabricated backstops are eyesores, and can be quite expensive, unless natural materials, such as stacked logs, can be used.

A rule-of-thumb for backstop size is three butt-widths wide and two butt-heights high. For example, a backstop behind a 4 x 4-ft butt would be 12-ft wide by 8-ft high. That equates to three, 4 x 8-ft, ½-in (or thicker), exterior-grade, plywood panels mounted vertically. Of course, other materials are available. The

only requirement is that the backstop must decelerate the arrow to zero, without substantial damage to the arrow, and without endangering anyone on or off the range.

### **III.B. Target Archery**

A few years ago, the most common butt used for outdoor target archery was the classic, circular, 50-inch diameter, grass butt. These heavy and expensive butts, however, may no longer be in production. Square butts made of the newer, lighter weight, foam or composite materials are now much more popular, and are sized to hold the standard 122-cm FITA face.

Target butts similar to those used on a field archery range may also be used, as long as portability is not required, and if the butts are sufficiently large to hold a standard 122-cm FITA face. Moreover, FITA faces are mounted such that the center is about 50 inches above ground, and tilted about 15° from vertical. For target rounds other than the 900 or American Round, common sense prevails.

Backstops are rarely required on a target archery range primarily because all the archers are shooting at the same time, and no one is allowed behind the targets except when all are scoring their arrows. Likewise, spectators must be clear of the safety zone behind the targets.

### **III.C. 2-D Animal Targets**

If required, target butts and backstops needed for a two-dimensional animal round, such as the WBHC Compulsory Round, are the same as those used on a field archery range. Broadhead target butts and backstops are not addressed herein.

### **III.D. 3-D Animal Targets**

A wide variety of very durable and realistic three-dimensional animal targets are now commercially available. The more popular brands have standard scoring lines engraved, and have replaceable sections, plugs, and/or back-up blocks for do-it yourself target refurbishment.

Reasonably realistic semi 3-D animal targets can also be handmade. A full-sized, color-printed, paper, animal target is glued on cardboard, and backed-up by an ethafoam (or similar) slab. The complete target is then cut out around the animal outline.

3-D animal targets are generally very portable, which means that a completely different bowhunter range can be set-up overnight. Some targets even have integral support stakes, while others are merely tied to any convenient tree or sapling.

## **SECTION V: DESIGNING AN OUTDOOR RANGE FOR SAFETY**

### **V.A. General Range Safety**

Safety on any archery range is comprised of three elements:

- Archery tackle.
- "Stupid Human Tricks."
- Range layout, targets and backstops.

Only the last item is discussed herein, and only for field archery and bowhunter ranges. Since target archery range layouts and shooting rules are specifically structured to avoid unsafe conditions, safety issues are fairly rare. Likewise, proper archery training and/or bowhunter education should handle the tackle and human elements.

It should be remembered that range design criteria can't be separated from range safety criteria. *The*

**first priority is — always — every archery and bowhunter range must be designed for safety.** The following material, therefore, emphasizes the most important safety issues related to the range and equipment design criteria outlined in the foregoing Sections II, III and IV.

### **V.B. Field Archery Range Safety**

Field archery range safety may be divided into two categories: (1) factors related to range layout and terrain, and (2) factors related to maintainable items, such as target butts, target lanes and lane obstructions.

The NFAA addresses both of these factors quite well in its Range Inspection Requirements. NFAA-chartered clubs with field ranges must be re-inspected every two years, and it's obvious that a club won't host many tournaments, invitationals or even club shoots, without being certified safe, and subsequently proven safe by repeated use.

The problem, unfortunately, is with temporary ranges set up specifically for large sectional or national tournaments. This problem is the result of (1) too many ranges being built on not enough land, (2) not enough help, and (3) not enough time. Very few ranges are perfectly safe the first time, which means that unless inspection teams conduct a "shoot-through" on the new range, there's a good chance that *there will be a significant safety issue* during the first day's round. Here's a summary of the kind of things often missed because of not having a "shoot-through":

- Waiting areas and shooting positions at the next target within the danger zone of the preceding target. This is the result of not having enough land. The NFAA's outdoor range safety guidelines, as described above, are good rules-of-thumb.
- Target butt positioned such that a road, path or another target is directly behind the butt, even if at a reasonably safe distance. *Any* unnatural movement in the sight window can cause an equally unnatural flinch and inadvertent arrow release.
- Lack of backstop or inadequately cleared area behind target butt. People *will* miss, and they *will* look for that missed arrow. Uncleared brush not only increases the chance of a ricochet, but it also increases the exposure of the search party to danger zones behind other targets.
- Leaky butts. Even if you never miss, pass-throughs put you in the same position as the guy who does miss the target.
- Non-backstopped target positioned on a brow of a hill, such that a missed shot becomes a flightshot.
- Uncleared paths to and between targets. Here, we're talking about safety afoot. The usual method of clearing field archery lanes is to brush-hog the saplings about one or two inches above the ground — just high enough to trip head-over-heels.
- Inadequate clearance above target lane. Even with a "shoot-through," the range inspectors often miss the fact that light-bowed and traditional shooters require more vertical clearance.
- Walk-ups which are also fan shaped. The problem here is that unlike a straight walk-up, an angled walk-up often gives the option of shooting four at a time. It depends on the angle of the fan whether this is safe or not. If there's any question, *don't shoot!*

### **V.C. Bowhunter Range Safety**

Here are some problems unique to bowhunter ranges, some of which are noted elsewhere here:

- Non-yielding obstructions (e.g., trees and limbs) blocking the animal kill area. When setting up a 3-D target, don't make the shot any different from that you would take in a real hunting situation. Moreover, remember the short person, the lefthander and the light-bowed bowhunter.
- Overlapping "miss" areas behind the targets. Because of no backstops and because of more missed shots (at 3-D targets), special care must be taken to make sure that a missed arrow doesn't end up behind another target.
- Steeplejack treestand shots. Shooting from elevated platforms is fun (although often bottlenecks), but don't make the shots ridiculously difficult — like hanging out over the railing. Also, make sure that the bow limb won't slap any part of the tree or platform upon release.
- Again, the "On Deck" area and shooting stakes at the next target being in the danger zone of the preceding target. The NFAA's safety buffer rule is even more important on a bowhunter range, especially if it's heavily wooded (more ricochets).