

# H32 Reticle

Spotting Scope System

THE HORUS SYSTEM

Model 2000 series

## User's Manual

January 2008



**FOR INFORMATION OR SALES**

**Horus Vision  
P.O. Box 616  
Lewiston, ID 83501**

**Phone: 866-568-2926**

**Email: [info@horusvision.com](mailto:info@horusvision.com)**

**Web: [www.horusvision.com](http://www.horusvision.com)**

1st Edition  
January 24, 2008

© 2008 Horus Vision  
All Rights Reserved

## Table of Contents

	Page
Disclaimer.....	1
Patent Information .....	2
Horus Vision® Warranty .....	2
Spotting Scope Overview .....	3
The H32™ Reticle .....	4
What Does the Horus™ H32 Reticle Do? .....	5
Specifications of the H32 Reticle .....	6
Ranging Mil Radian .....	7
Ranging Metric Method .....	9
Target Speed .....	12
Communication Aid for Spotter and Rifleman ....	16
Second Shot Correction™ .....	18
Comments .....	20
The H34 Reticle .....	21
The H36™ Reticle .....	22

## **DISCLAIMER**

Please be careful when using firearms. A mistake in judgment, a lapse of attention, a malfunction of any kind can result in injury or death. Bad things sometimes happen to good people.

Please remember these rules of firearm safety:

1. Treat every gun as if it were always loaded.
2. Never allow your gun's muzzle cover anything you aren't willing to destroy.
3. Keep your finger off the trigger until you're ready to shoot.
4. Be sure of your target and what's beyond.

The information in the manual, while believed to be reasonably accurate as of the date of publication, is not warranted or represented to be accurate, correct, or useful for any particular purpose. Use the information in this manual with caution and common sense, and verify the information with respect to your own firearms before use.

The author and publishing company accept no responsibility for errors in the information presented herein, or for accidents, injuries, damage, or any other problems which might arise as a result of your use of the information contained in this publication, and expressly disclaim all liability for injuries, death and damages, whether direct, incidental, consequential, punitive or otherwise.

We are also not responsible for tornadoes, earthquakes, firecrackers that go off in your hand, mad cow diseases, floods, failed crops, or El Nino. So Be Careful!

## **PATENT INFORMATION**

HORUS VISION® and the EYE OF THE FALCON logo are registered trademarks of Horus Vision and may not be used in any manner without express permission from Horus Vision. SECOND SHOT, TACTICAL SOLUTIONS, and TARGETING SOLUTIONS are trademarks of Horus Vision and may not be used in any manner without express permission from Horus Vision.

Horus Vision software products and written and visual materials are protected by U.S. and international copyright protection and may not be used in any manner without express permission from Horus Vision.

A wide variety of scopes, reticles, software, computer systems, and other products associated with shooting and ballistics (“Horus Vision systems”) are exclusively owned by Horus Vision and are protected by issued patents in the United States, including U.S. Pat. Nos. 5,920,995, 6,032,374, 6,453,595, 6,516,699, and 6,681,512, issued foreign counterparts, as well as numerous additional pending patent applications in the United States and foreign jurisdictions, including, but not limited to Europe, Japan, Israel, Canada, and Australia. Manufacture, sale, importation, or use of the Horus Vision systems requires a license from Horus Vision. For more specific information on obtaining a license, please contact Horus Vision.

Nothing contained herein should be construed as granting, by implication, estoppel, or otherwise, any license or right to use any Horus Vision intellectual property.

## **THE HORUS WARRANTY**

- 30 day money back guarantee.
- 2 year direct replacement normal wear and tear excepted.
- Limited lifetime warranty for defects and workmanship

The product is covered by a lifetime warranty against manufacturer’s defects. Please be aware that the warranty only covers manufacturer’s defects. It does not cover the following:

- General wear and tear, such as scratches, dents, nicks, or missing pieces
- Water damage
- Fading/chipping of the material on the product
- Lost or stolen parts
- Damage due to personal misuse or negligence.

Limitations on Damages: For breach of any written or implied warranty on this product, the consumer is limited to the following damages: Repair of the product or replacement with an identical or equivalent model, at the election of Horus Vision. Horus Vision is not liable for any other damages, such as special, incidental, or consequential damages, resulting from the use of this product. Note: Some states do not allow the exclusion or limitation of special, incidental or consequential damages.

## THE SPOTTING SCOPE

The variable power spotting scope is a valuable tool for the forward observer, designated marksman, sniper, artillery and tank crews. While primarily used for observation, the Horus Vision Spotting Scope with the Patented Horus Vision Reticle can be used to make target 'strike' adjustments with precision. This variable power unit has the following benefits:

At the higher powers, the observer can see greater detail, define smaller objects, and use the Horus Vision H32 reticle to spot shots on target. The higher powers work best in colder weather or in the cooler temperatures of early morning hours. As the daytime temperatures rise, the spotting scope at these higher powers will encounter the distortions of mirage and temperature waves unless the spotter is positioned above these conditions. As a result, the usefulness at the highest power is diminished.

At Mid to Low Power, The observer enjoys a greater field of view and therefore can observe a much larger area of activity. At these lower powers, the effect of mirage and temperature waves is reduced, therefore, as the temperatures rise increasing the mirage factor, by simply reducing power, these conditions become manageable and the target can still be observed.

The 12-40X60 Spotting Scope Optic is fitted with the new Horus Vision H32 Reticle. This reticle is calibrated in Milliradians. A Milliradian in this optic subtends to 3.6 inches at 100 yards or 10cm at 100 Meters.

## **The Horus Vision H32 Reticle**

### **A powerful tool for the military spotting scope**

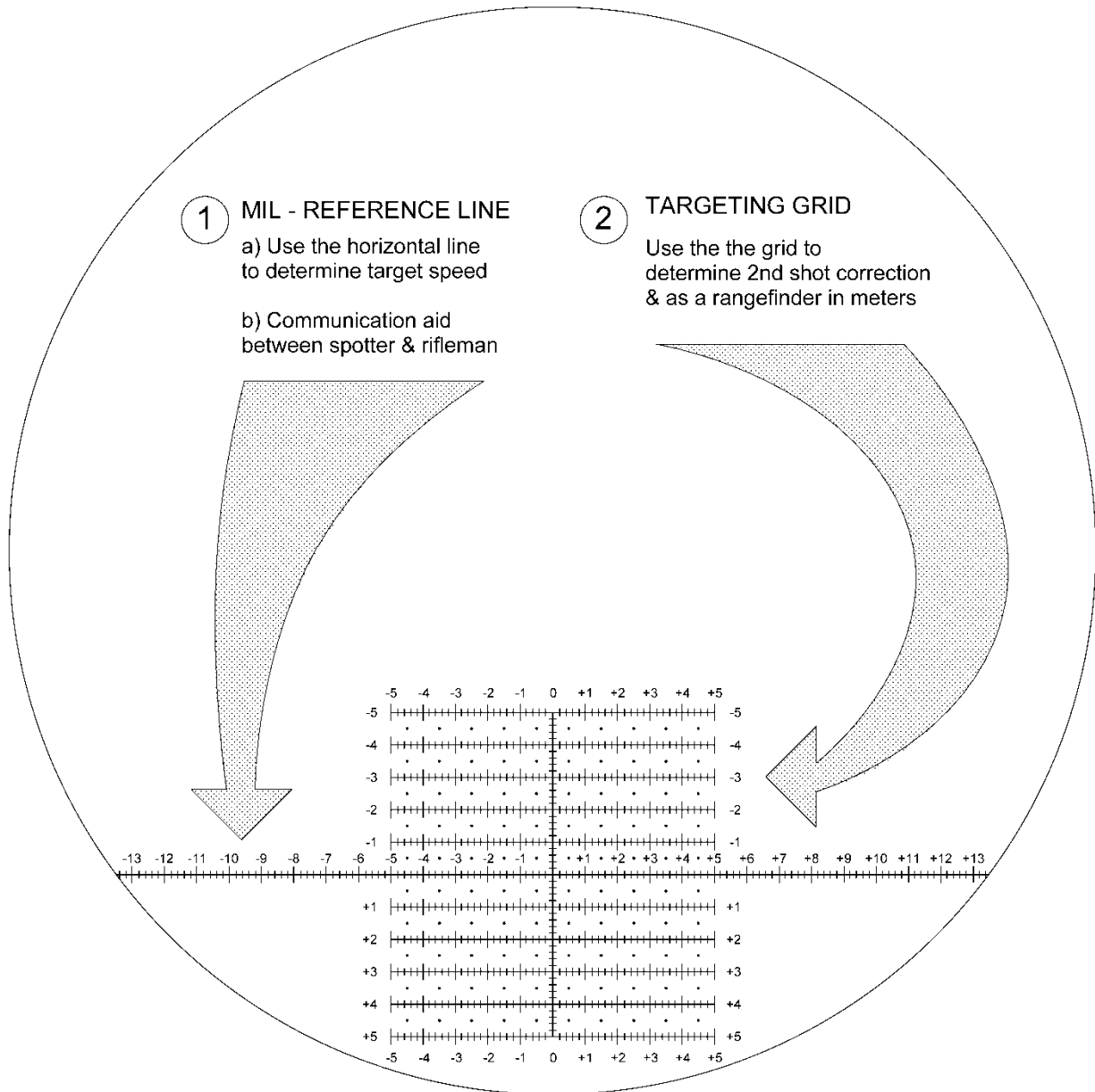
The Horus Vision H32 Reticle is a precisely calibrated reticle and is installed in the internal optics of the spotting scope. It is a powerful tool in range estimation, speed estimation, “2nd shot correction” and as a communication aid between spotter and rifleman. The reticle is located in the first focal plane of the scope, therefore calibration and accuracy are unaffected by power changes even though the reticle appears to change size.

The H32 was developed after numerous comments about the H36 reticle. As a result of these comments, Horus designed a new reticle. The H32 design is unique since we lowered the main targeting grid approximately 5 Mils. Lowering the targeting grid gives the User a larger unobstructed field of view. The backward “L” IOA range finder was eliminated since the military does not use inches and yards. The mil reference line was added for speed calculations and for use as a communication aid for spotter and rifleman.

The H32 reticle has no moving parts and does not require batteries which are subject to failure. The H32 gives the spotter a passive system that leaves no telltale optical signature that could result in less than optimal consequences for the rifleman and spotter. It also eliminates the need to carry additional equipment such as a laser range finder, etc.

# What does the Horus Spotting Scope Reticle do?

## H32



Horus Vision, LLC.  
650-588-8862  
Email: [info@horusvision.com](mailto:info@horusvision.com)  
Web: [www.horusvision.com](http://www.horusvision.com)





# A) RANGEFINDING MILLIRADIAN METHOD

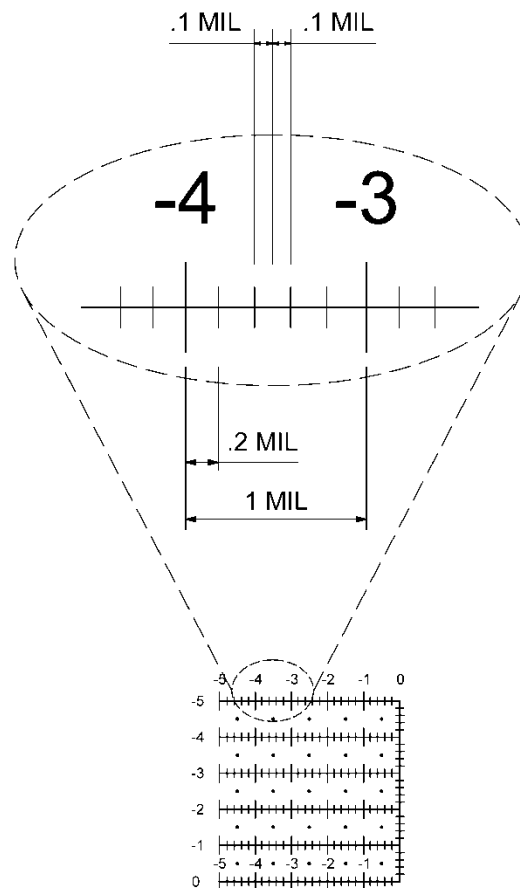
Using the Upper Left Quadrant of the Main Targeting Grid as a Rangefinder

Rangefinder Grid Based on:

A Circle = 6283 MILS (USMC Standard)

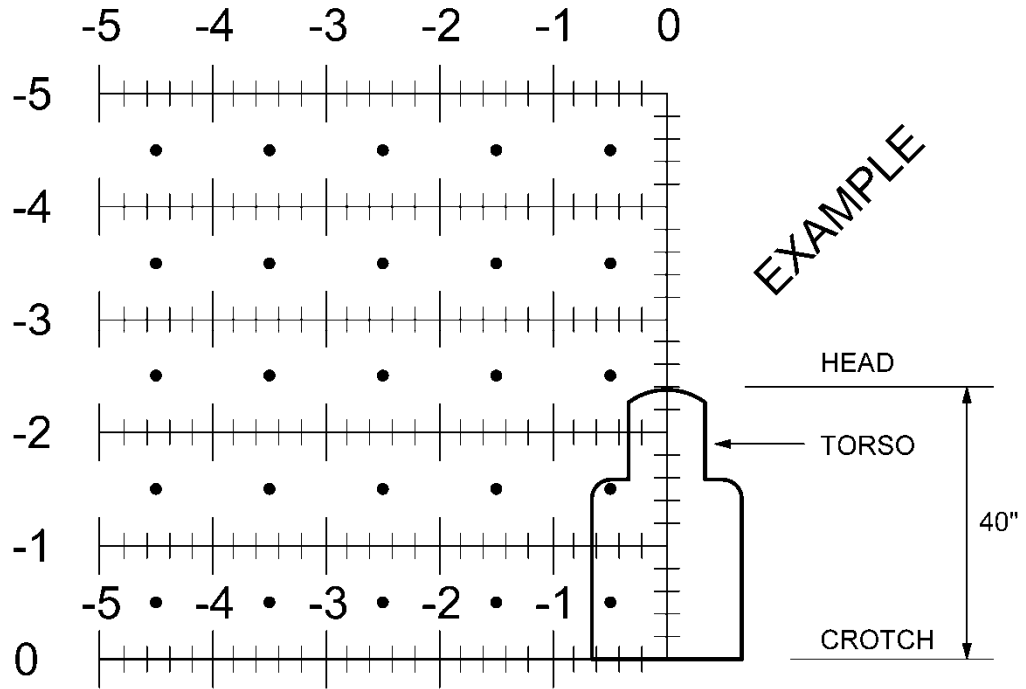
1 MIL = 3.60 inches @ exactly 100 Yards

1 MIL = 10.0 cm @ exactly 100 Meters



Note: You can use any part of the grid for range finding

# RANGEFINDING USING THE MILRADIAN METHOD



TARGET = 40 OR  $40'' / 36 = 1.11$  YARDS

HEIGHT IN RANGEFINDER = 2.4 MILS

$$\text{RANGE} = \frac{\text{HEIGHT OF TARGET IN YARDS} \times 1000}{\text{HEIGHT OF TARGET IN RANGEFINDER IN MILS}}$$

$$\text{RANGE} = \frac{1.11 \times 1000}{2.4} = 463 \text{ YARDS}$$

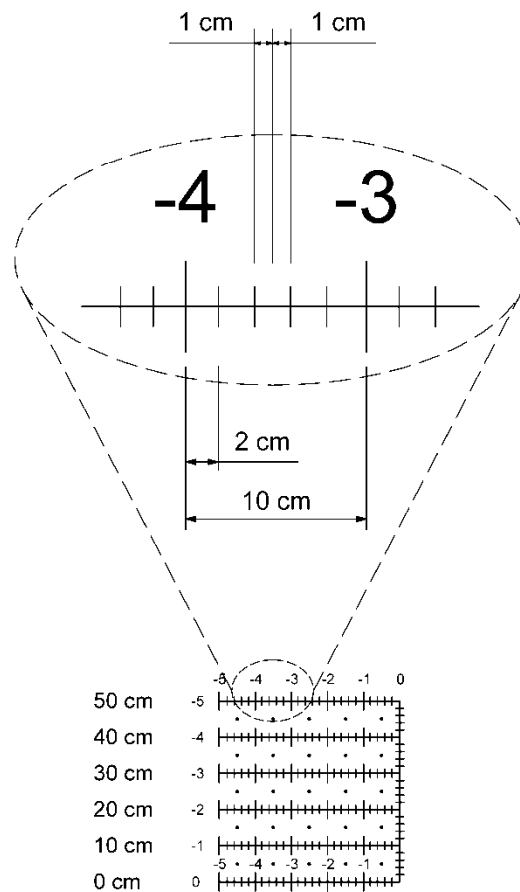
NOTE: "1000" IS A CONSTANT  
FOR U.S.M.C. MIL DOT

## B) RANGEFINDING METRIC METHOD

Using the Upper Left Quadrant of the Main Targeting Grid as a Rangefinder

Rangefinder Grid Based on:  
1 MIL = 10.0 cm @ exactly 100 Meters

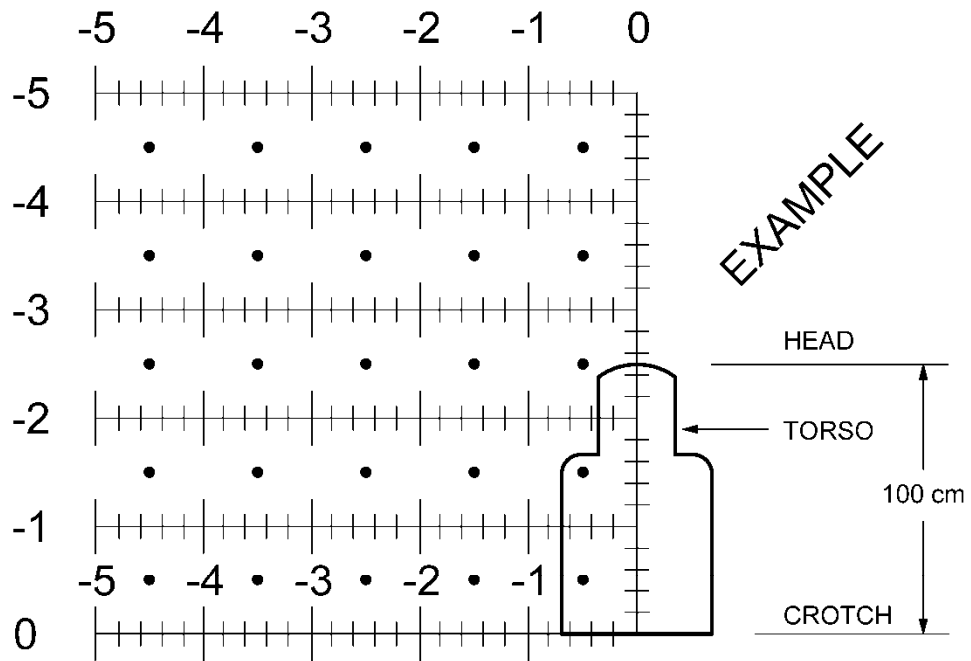
(Simply add a zero to the Mil number  
& you have a Centimeter Scale)



Note: You can use any part of the grid for range finding

# RANGEFINDING USING THE METRIC METHOD

(USING THE TARGETING GRID CALIBRATED IN USMC MILS)



TARGET = 100 CENTIMETERS

HEIGHT IN RANGEFINDER = 25 CENTIMETERS

$$\text{RANGE IN METERS} = \frac{\text{HEIGHT OF TARGET IN CENTIMETERS} \times 100}{\text{HEIGHT OF TARGET IN RANGEFINDER IN CENTIMETERS}}$$

$$\text{RANGE IN METERS} = \frac{100 \text{ cm} \times 100}{25 \text{ cm}} = 400 \text{ METERS}$$

NOTE: "100" IS A CONSTANT FOR THE METRIC METHOD

Horus Vision's targeting software designed for use in handheld computers also include a simple to use "Range Estimator".

Sample Screen ATRAG™ MP Software shown below:

**Target Range Estimator**

When using WIDTH to size a target, Up/Dwn Angle does not effect range calculation but will effect bullet drop.

	Using Target	<b>Height</b>	<b>Width</b>		
Target Size	<input type="text" value="36"/>	<input type="text" value="in"/>	<input type="text" value="ft"/>	<input type="text" value="cm"/>	<input type="text" value="M"/>
Image Size	<input type="text" value="1"/>	<input type="text" value="mil"/>			
Angle	<input type="text" value="0"/>				
Est Range	<input type="text" value="1000"/>	<input type="text" value="Y"/>	<input type="text" value="M"/>		

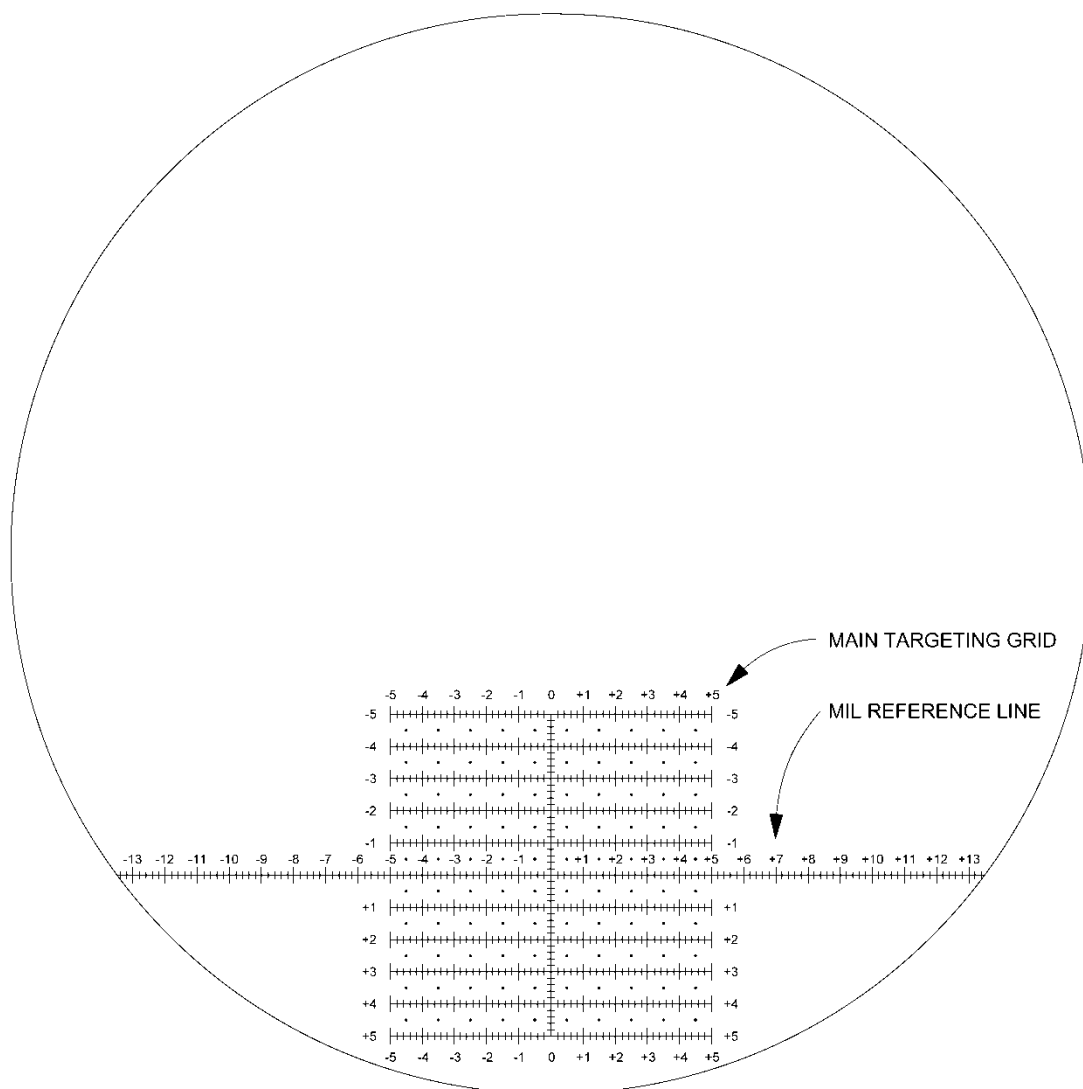
1 2 3 4 5 6 7 8 9 0 .

Done Cancel Prev Next

## TARGET SPEED

### A PASSIVE METHOD OF DETERMINING TARGET SPEED

The H32 spotting scope reticle features a “MIL-Reference Line” that gives the rifleman and/or spotter a tool to determine target speed. This passive method is unique because it eliminates the need to carry another piece of specialized equipment. Also, this high tech equipment is subject to breakdowns, low battery problems, etc., Additionally, certain types of electronic/optical devices may reveal themselves to the target by an optical signature which will result in less than optimal consequences for the rifleman/spotter.



The MIL-Reference Line on the H32 reticle appears as a long horizontal line that bisects the central targeting grid into 2 equal parts. From the center of the targeting grid, the MIL-Reference line covers 26 Mils to the right and 26 Mils to the left.

Using the MIL-tick marks on the horizontal “MIL-Reference Line” in combination with a watch, you can calculate the speed of an individual, or a vehicle.

For Range, please see preceding pages on range-finding.

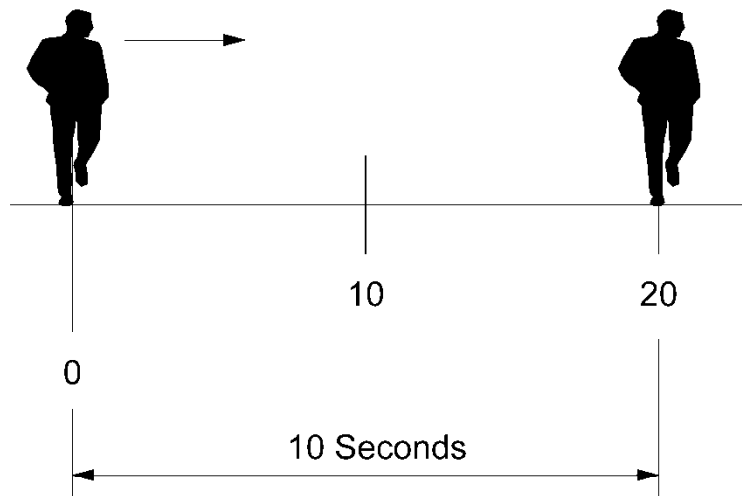
Use the following math formula to manually perform the necessary calculations.

$$\text{Meter per second} = \frac{(\text{Number of Mils covered}) \times \left( \frac{\text{Range Meters}}{1000} \right)}{\text{Seconds}}$$

Conversion factor:

$$\text{MPH} = (\text{m/sec}) \times (2.237)$$

### Example #1



Number of MILS covered = 20 MILS

Range = 900 Meters

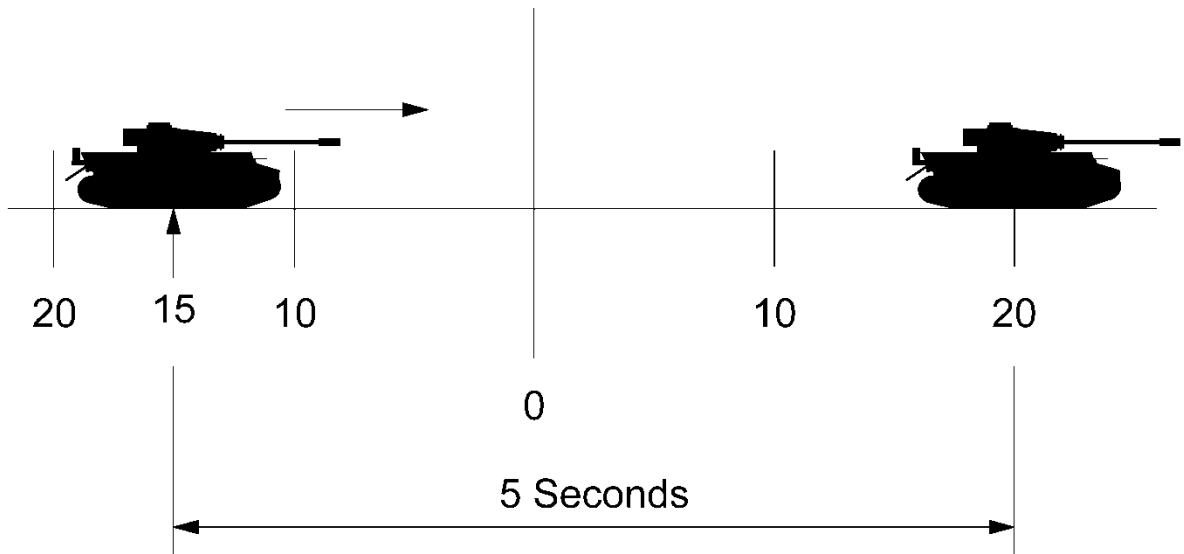
Time = 10 Seconds

$$\frac{(20 \text{ MILS covered}) \left( \frac{900 \text{ Meter Range}}{1000 \text{ Constant}} \right)}{10 \text{ Seconds}} = 1.8 \text{ meters/ sec}$$

$$(1.8 \text{ meters/second}) (2.237 \text{ conversion factor}) = 4.03 \text{ mph}$$



## Example #2



Number of MILS covered = 35 MILS

Range = 2000 Meters

Time = 5 Seconds

$$\frac{(35 \text{ MILS covered}) \left( \frac{2000 \text{ Meter Range}}{1000 \text{ Constant}} \right)}{5 \text{ Seconds}} = 14 \text{ meters/ sec}$$

$$(14 \text{ meters/second}) (2.237 \text{ conversion factor}) = 31.32 \text{ mph}$$

Horus Vision's targeting software designed for use in handheld computers also include a simple to use "Target Speed Estimator".

Sample Screen ATRAG MP Software shown below:

The screenshot shows a handheld device screen with a black header bar containing the text "Target Speed Estimator" in white. Below the header, there are four rows of input fields and a numeric keypad. The first row is labeled "Target Range" and contains a text box with "1000", a radio button selected under "Y", and another radio button under "M". The second row is labeled "Num Tics" and contains a text box with "10", a radio button selected under "mil", and radio buttons under "moa" and "in". The third row is labeled "Time (secs)" and contains a text box with "1". The fourth row is labeled "Est Speed" and contains a text box with "20.5", a radio button selected under "mph", and a radio button under "m/s". At the bottom of the screen is a numeric keypad with buttons for digits 1-9, 0, and a decimal point. Below the keypad are four buttons labeled "Done", "Cancel", "Prev", and "Next".

## **COMMUNICATION AID BETWEEN SPOTTER AND RIFLEMAN**

The Horus Spotting Scope reticle solves problem of rifleman and spotter being able to rapidly locate and focus on a specific target his counterpart sees.

When a rifleman and spotter are working as a team, the H32 reticle's horizontal "Mil Reference Line" provides a highly calibrated milliradian scale that is identical to the horizontal lines in the riflescope. Since the riflescope and spotting scope have similar precision reticles, they can convey exact distance information to each other.

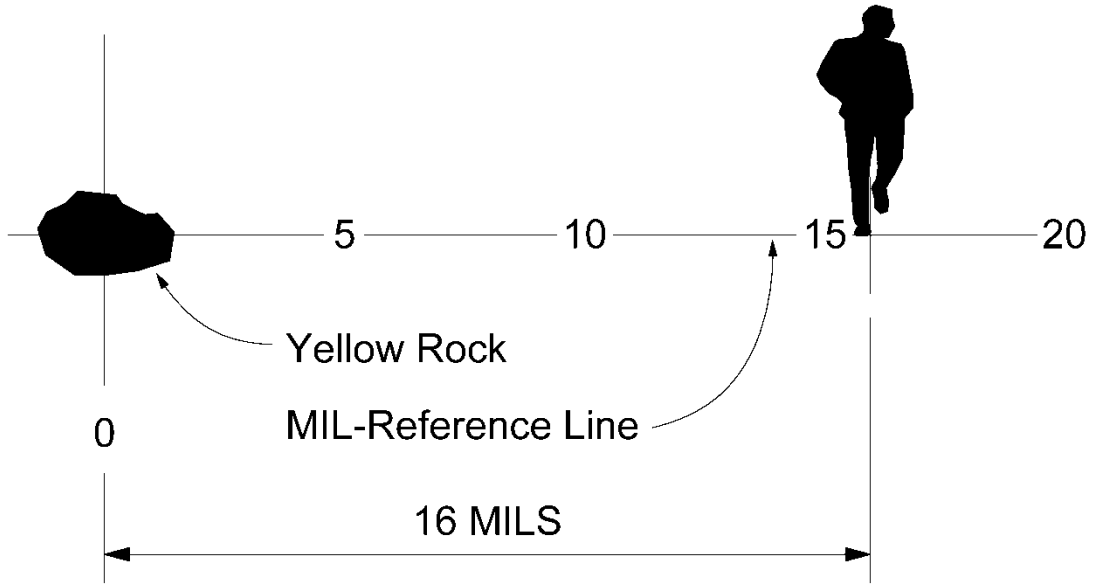
### **Example**

The spotter locates a target. The spotter finds a reference point that the rifleman can rapidly locate. Using the Mil-Reference Line in his spotting scope, the spotter notes the target is 16 Mils to the right of the reference point (i.e. a yellow rock).

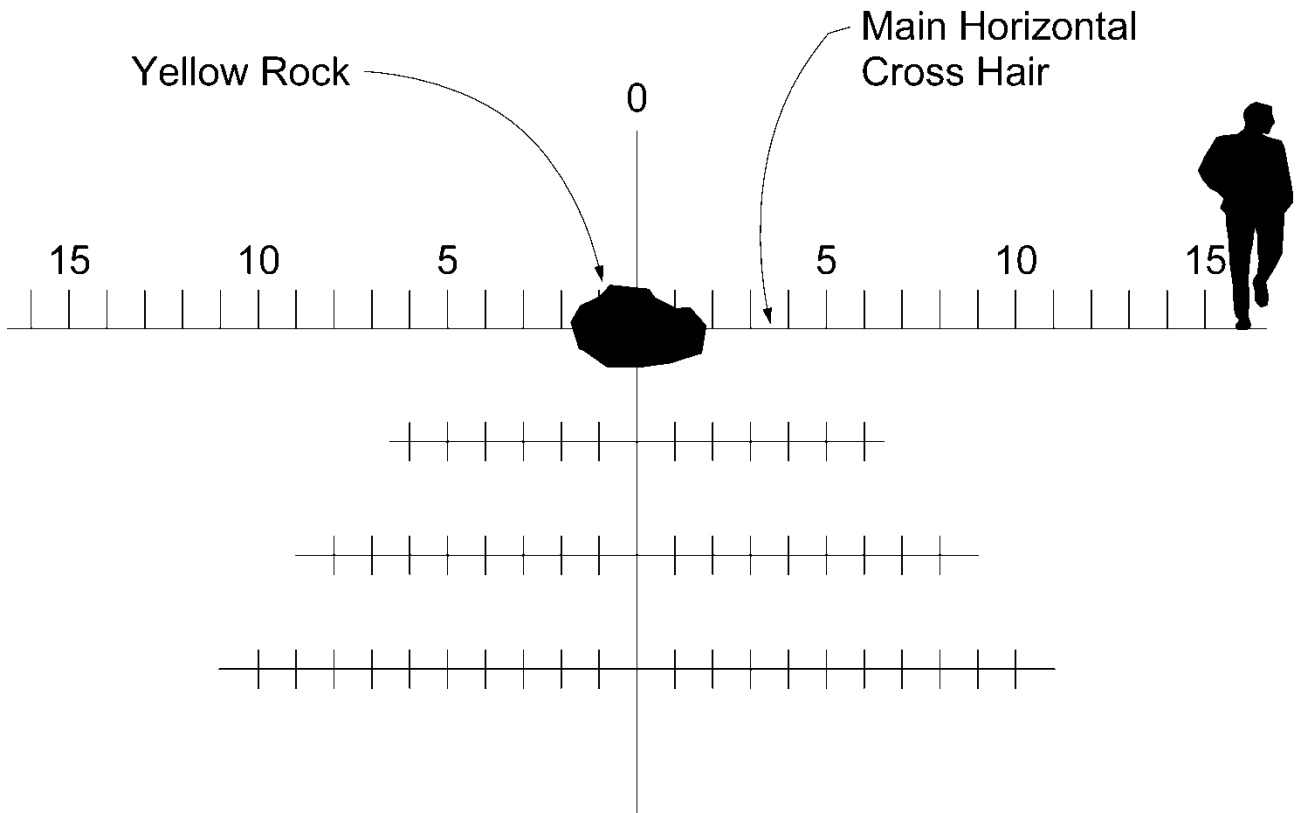
The spotter might say, "See the yellow rock next to the curve in the road; your target is 16 Mils to the right behind the fallen tree".

The rifleman using his riflescope with the H37™ Horus reticle locates the yellow rock (reference point). He simply follows the horizontal mil-line in his scope until he counts off 16 mils. He should be on target.

# Spotting Scope View



# Riflescope Scope View



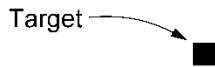
## **SECOND SHOT CORRECTION**

All variable power spotting scopes that employ the H32 Reticle are in the 1st focal plane. All calibrations are accurate throughout the power ranges of the spotting scope. When using the spotting scope with the H32 Reticle for 2nd shot correction, please use the highest magnification that ambient conditions allow.

When the rifleman and the spotter are working as a team, the H32 Reticle becomes a valuable tool for increasing the lethality of the team because of its accurate ranging and patented 2nd Shot Correction feature. In the event the rifleman misses the 1st shot, the H32 Horus Reticle features a unique non-mathematical method for the spotter to provide very accurate correctional fire data. This data allows the rifleman the ability to rapidly correct for his 2nd shot without taking his eye off of the target. See the following illustrated example:

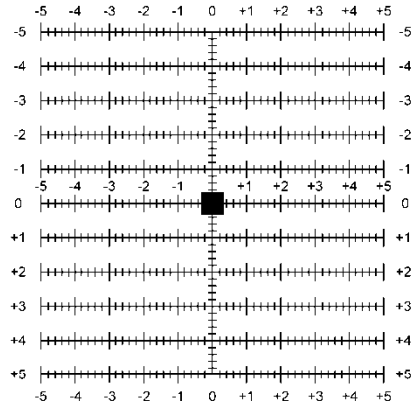
# 2ND SHOT CORRECTION - SPOTTING SCOPE

1



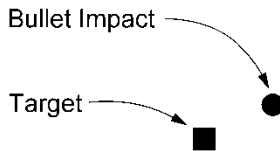
2

The spotter places the target to be engaged by the rifleman dead center in the grid at line 0



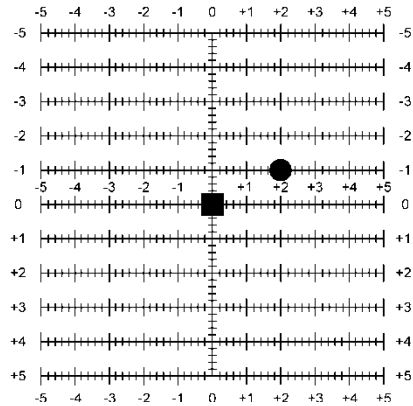
3

The rifleman fires and the spotter notes that the bullet impact is high and to the right.



4

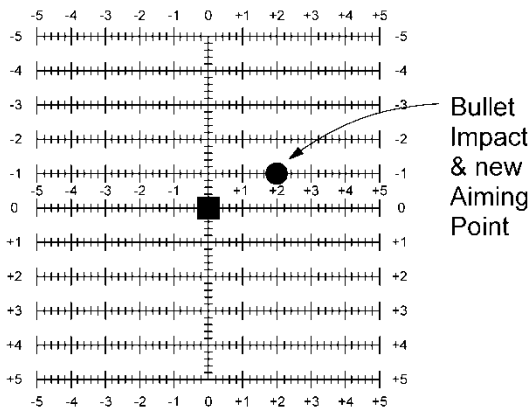
The spotter sees where the bullet hit and informs the rifleman that the impact is 1 mil up and 2 mils to the right.



Note: Bullet impact is on line +2 and 2 hackmarks to the right.

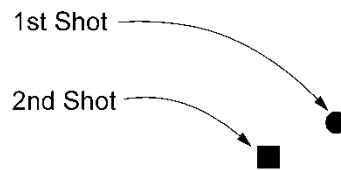
5

To correct his aim point, the rifleman moves his original aim point 1 Mil up & 2 Mils to the right as his new aiming point.



6

If you did everything properly, you should have a bullseye.



## A LETTER FROM THE 'FIELD'

Sent: Thursday, September 22, 2005 4Z:27 PM

To: dennis@horusvision.com

Subject: Spotting Scope

\_\_\_\_\_ is assigned the OPFOR mission at \_\_\_\_\_, Crucial to our success is our recon teams. We use dismounted recon as our primary intel assets because of their concealability and small signature. Because they are dismounted they are very choosy on what equipment they bring on missions. One piece of gear that is a 'must' is the Horus Vision spotting scope. These have been useful in numerous ways. As an optical device they are excellent. The long range spotting ability of the scope is a great improvement over standard binoculars for identifying and classifying long range targets (sometimes over 15km away). The fact that they are light, compact, and rugged (with their own padded nylon case attached) makes them a good piece of gear for our scouts.

The mil scale reticle is also useful for getting range determinations. Until we received the LP-10 artillery spotting optics we were completely dependent on the Horus Vision scopes for range calculations at observed targets. If something was spotted out in the open desert, and its locations could not be determined by terrain association, we would use the scope's mil scale system. Scout teams carried size measurement lists of common military equipment. Once something was spotted the scouts would calculate the mil size of the object, then compare it with the equipment size chart. That would give a rough estimate of range. Combine this with a known observer location and a compass azimuth to the target, and you have a location to the observed object.

We also used the spotting scopes in their intended roles while out on the tang gunnery ranges. When screening the tanks main armament the Horus system could give very accurate measurements of target hits in relation to the center mass on the 1500m screening targets.

MAJ \_\_\_\_\_  
Executive Officer

# A New Reticle for Spotting Scopes

(Available Fall 2007)

## H34 Spotting Scope Reticle

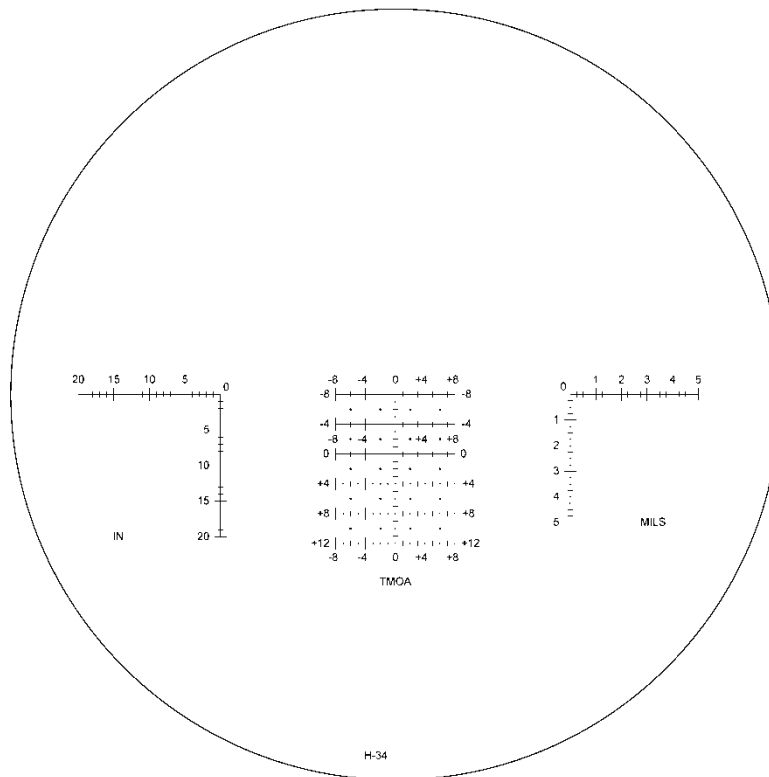
The H34 was designed to facilitate the rifleman using the Mil-Dot Rifle scope that has come-up adjustments (clicking) calibrated in TRUE MINUTE OF ANGLE (TMOA).

One (1) TMOA subtends exactly 1 inch at exactly 95.5 yards. The Central Targeting Grid of the H34 is calibrated in TMOA, which matches the calibration adjustments of most Mil-Dot Rifle scopes. This uniform calibration allows a very accurate 2nd Shot Correction.

The H34 has 2 rangefinders. The first (1st) is located on the lower left quadrant and is calibrated in Inches of Angle (IOA) for those using inches and yards as a medium of measure. The second (2nd) is located on the lower right quadrant and is calibrated in USMC Mils for those using the milradian method of measure.

### How is it different than the H36 spotting scope reticle?

Horus Vision's current spotting scope reticle the H36 has a Central Targeting Grid calibrated in Mils, (6283 Mils equals 1 circle.). The H36 was designed to facilitate a rifleman using a rifle scope equipped with the Horus Reticle or a conventional rifle scope with the come-up calibrated in Mils and /or metric equivalent.



H34



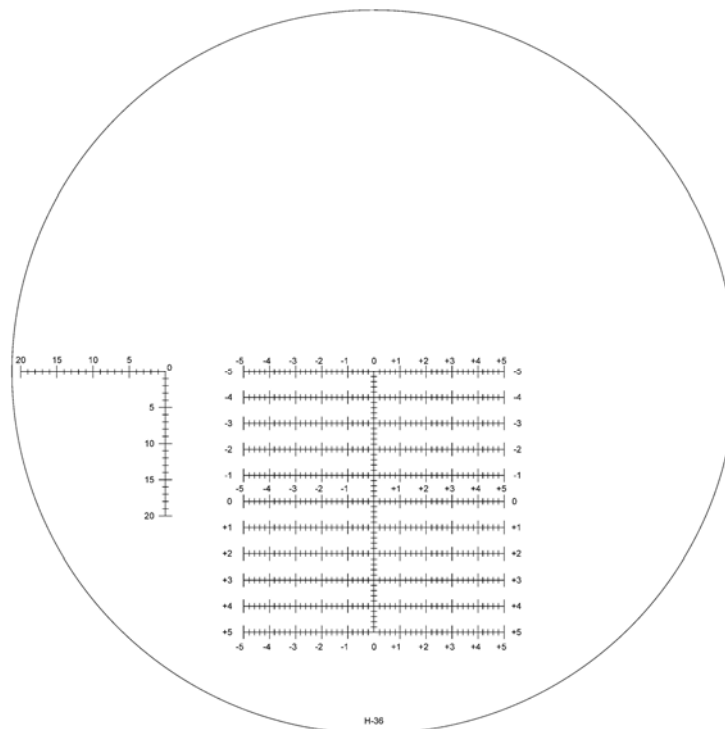
## SPOTTING SCOPE RETICLE

### The Horus Vision H36 Reticle

The Horus Vision H36 Reticle is a precisely calibrated reticle and is installed in the internal optics of the spotting scope. It is a powerful tool for both range estimation, and “2nd Shot Correction”. The reticle is located in the first focal plane of the scope, therefore calibration and accuracy are unaffected by power changes even though the reticle appears to change size.

The H32 spotting scope reticle differs from the H36.

The H36 spotting scope reticle looks similar to the H32 reticle. Upon careful inspection, the difference is apparent. The targeting grid in the H36 is located much higher in the field of view; whereas, the H32’s targeting grid is approximately 5 Mil lower. The H36 sports the Horus backward “L” range-finder calibrated in inches/angle (10A) for those individuals who are used to working with a medium of inches and yards. The H36 has no “Mil-Reference Line”; the H32 has a “Mil-reference line”.



Horus Vision  
P.O. Box 616  
Lewiston, ID 83501  
Phone 866-568-2926  
Email: [info@horusvision.com](mailto:info@horusvision.com)  
Web Site: [www.horusvision.com](http://www.horusvision.com)