

POCKET LASER RANGEFINDER

2001 Joint Services Small Arms Symposium
August 16, 2001

William Dunnill
Juerg Gees
Daniel Schneider
Jos van Seeters
Dusan Zadavec

Leica Technologies Inc
703-777-3900
Bill.dunnill@lti.leica.com



Report Documentation Page		
Report Date 16Aug2001	Report Type N/A	Dates Covered (from... to) -
Title and Subtitle Pocket Laser Rangefinder	Contract Number	
	Grant Number	
	Program Element Number	
Author(s) Dunnill, William; Gees, Juerg; Schneider, Daniel; Seeters, John Van, Zadavec, Dusan	Project Number	
	Task Number	
	Work Unit Number	
Performing Organization Name(s) and Address(es) Leica Technologies Inc	Performing Organization Report Number	
Sponsoring/Monitoring Agency Name(s) and Address(es) NDIA (National Defense Industrial Association) 211 Wilson Blvd, STE. 400 Arlington, VA 22201-3061	Sponsor/Monitor's Acronym(s)	
	Sponsor/Monitor's Report Number(s)	
Distribution/Availability Statement Approved for public release, distribution unlimited		
Supplementary Notes Proceedings from the 2001 Joint Services Small Arms Symposium, Exhibition & Firing Demonstration 13-16 August 2001 Sponsored by NDIA, The original document contains color images.		
Abstract		
Subject Terms		
Report Classification unclassified	Classification of this page unclassified	
Classification of Abstract unclassified	Limitation of Abstract UU	
Number of Pages 20		

Outline

- Pocket Laser Rangefinder (PLRF)
- Range improvement
- Laser Rangefinder/Digital Magnetic Compass Module

LEICA PLRF - Pocket Laser Rangefinder



- Range > 1km
- Pocket size rangefinder
- Handheld
- Button operated
- Adaptation to NV
- IAW MIL-STD 810
- Submersible 66 ft

LEICA PLRF - General Characteristics

Rangefinder

- Range performance: 50 - 1000 m
(albedo 0.1, target size 1 x 1 m)
- Measurement range: 5 - 2500 m
(theoretical on display)
- Accuracy: ± 2 m
- Diode laser: 905 nm
1550 nm
- Eye-safety: Class 1
according to ANSI Z 136.1 (2000)



LEICA PLRF - General Characteristics

Miscellaneous

- Battery capacity: > 5000 shots
- Dimensions: 4.5 x 3.7 x 1.7 inch
- Weight: 17 oz
- Interface: NV AN-PVS14



Optics

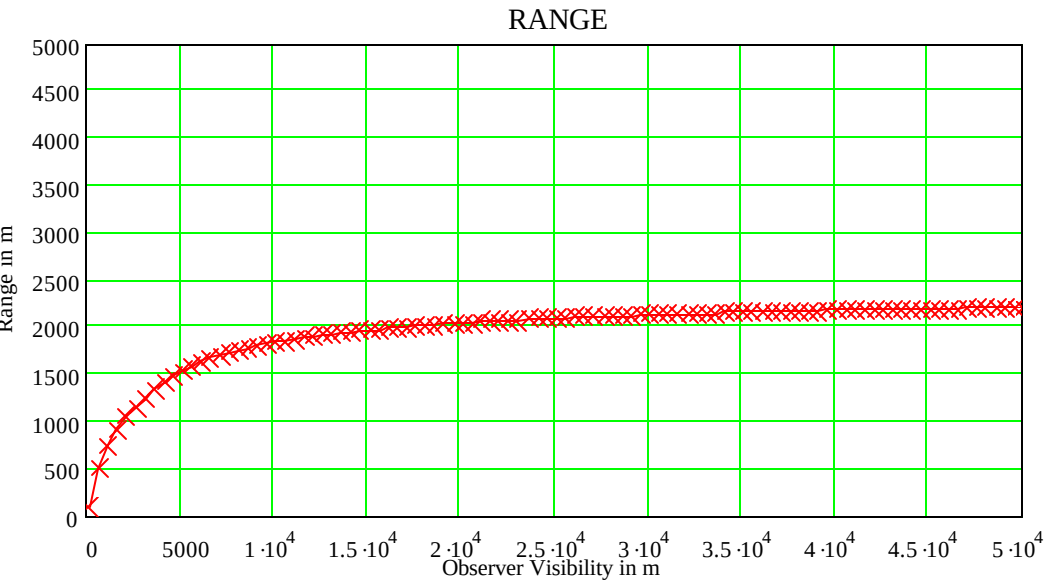
- Magnification: 6 x 30
- Configuration: monocular



PLRF - Status

- Order for 2 each ETU (engineering test unit) from Department of the Navy, USA
- 2 x ETU, 905 nm technology delivered in April 2001
- 2 x ETU, 1550 nm technology delivered in July 2001
- Currently undergoing operational tests

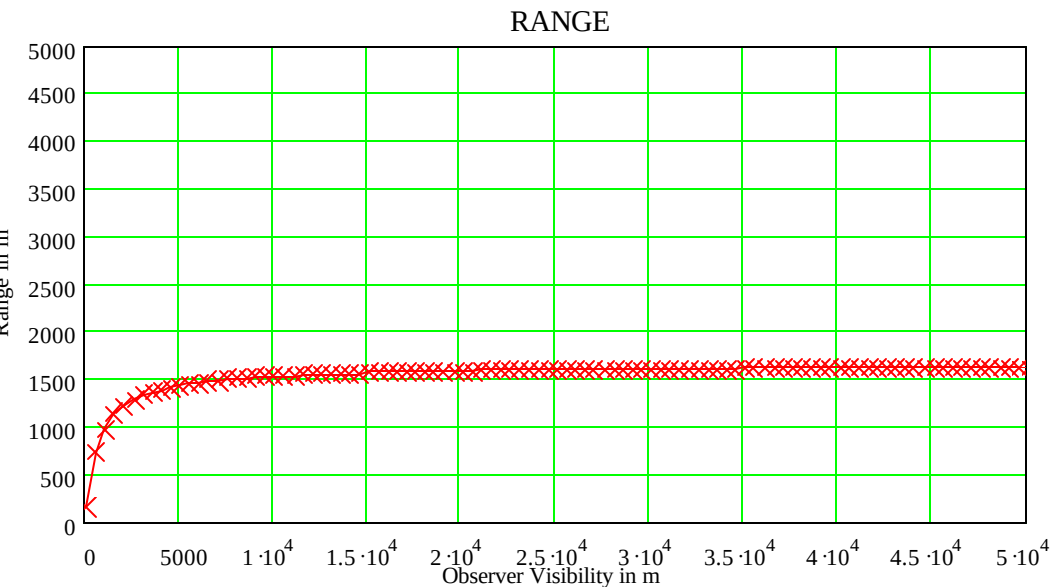
PLRF Range versus Visibility



Target size 2.3 m (NATO), Albedo 0.1

Wavelength: 905 nm

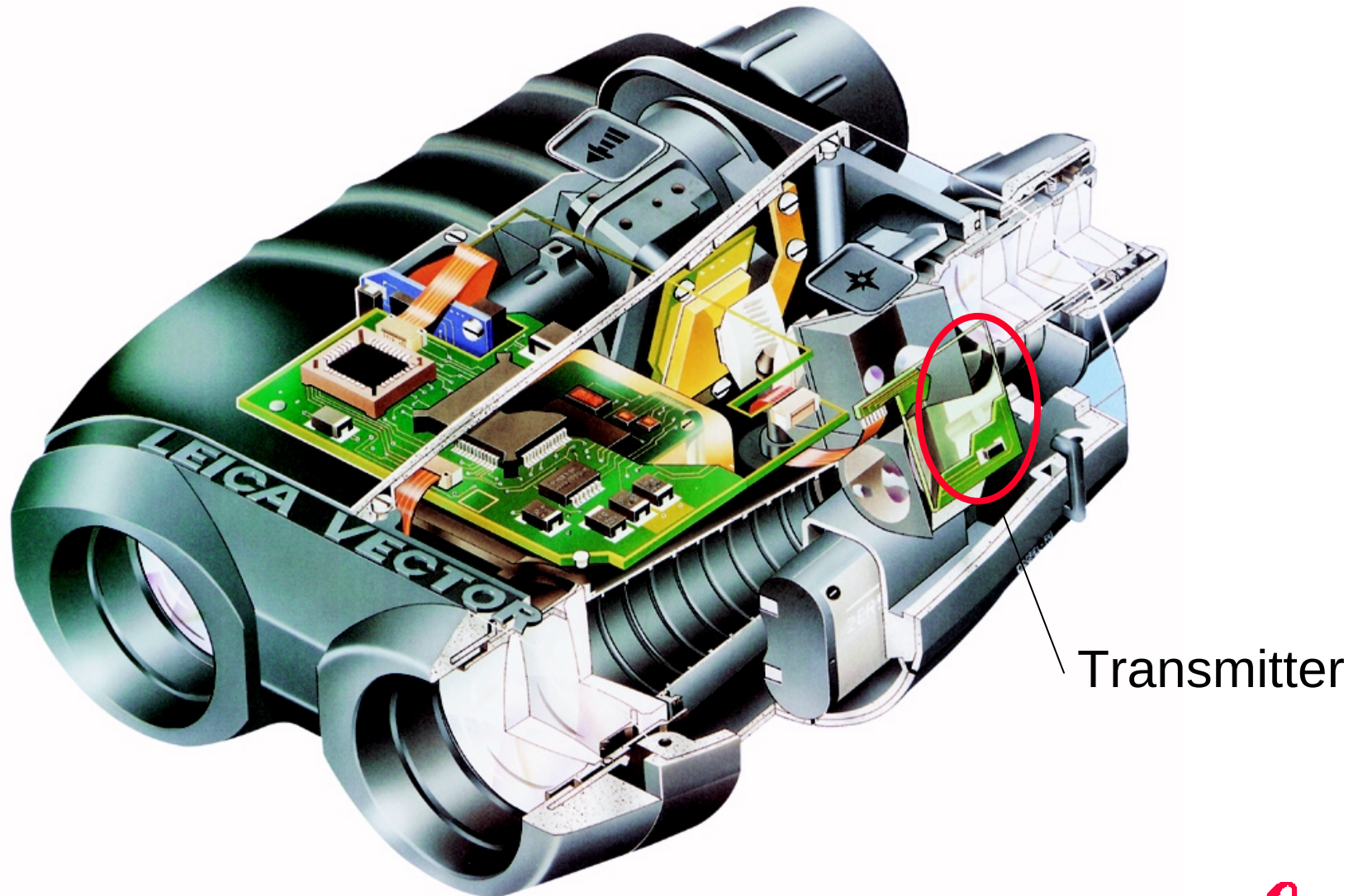
Beam Divergence: 0.4 x 1.3 mrad



Wavelength: 1,550 nm

Beam Divergence: 2.0 x 2.0 mrad

Range Enhancement – Vector/Viper Test Bed



VECTOR IV/VIPER Beam Shaper

Goal : **Range Improvement**

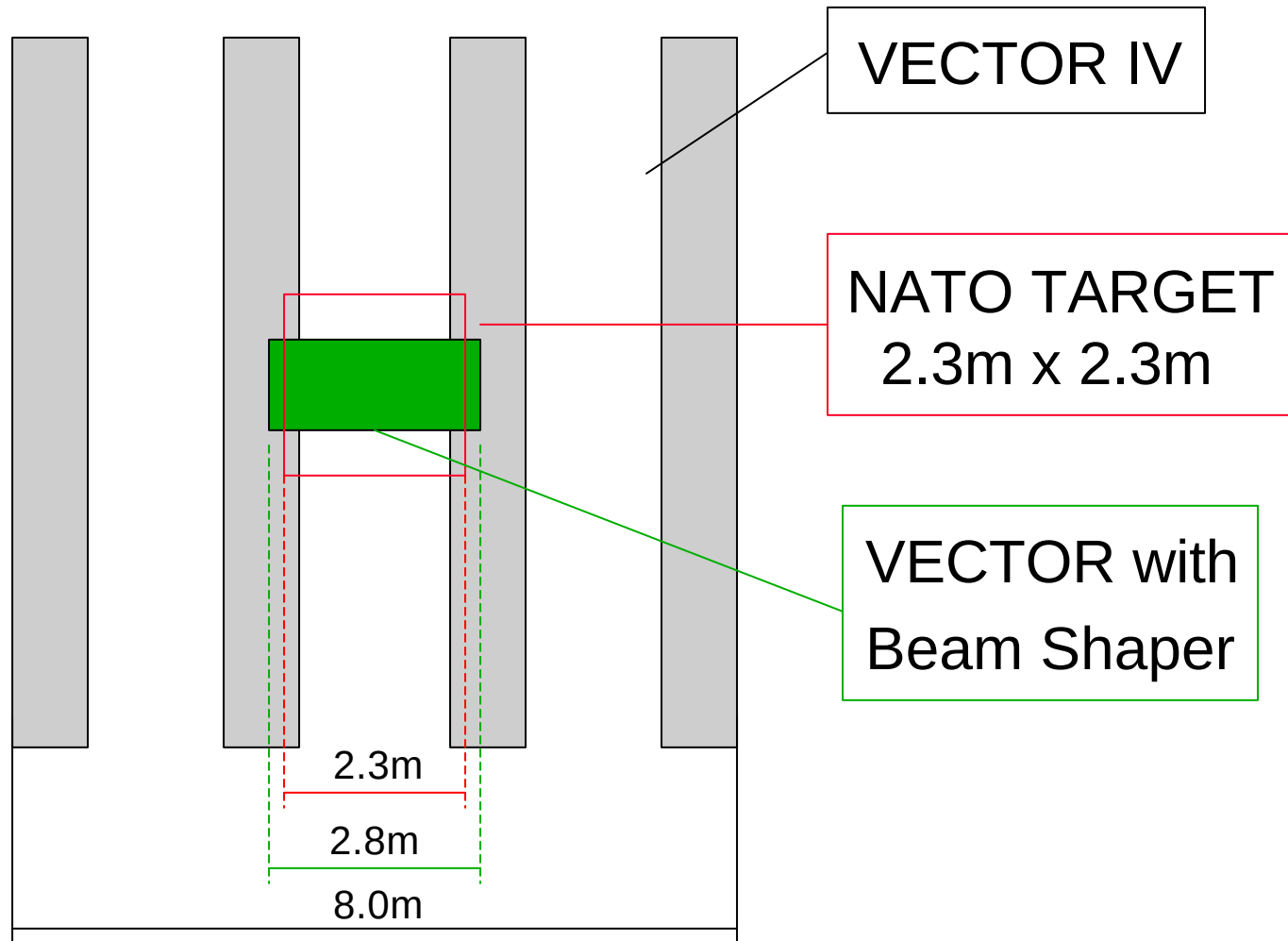
VECTOR IV/Viper

- Beam divergence 2.0 x 2.0 mrad
- Effective optical laser output 19 %

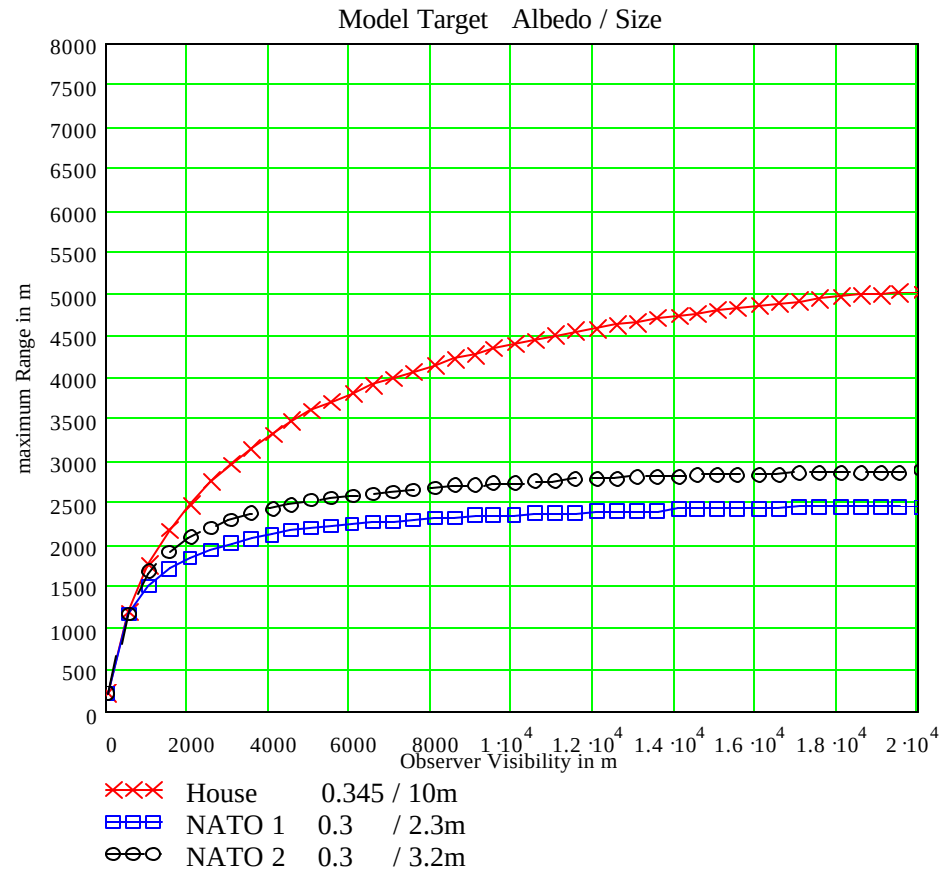
VECTOR with Beamshaper

- Beam divergence 0.7 x 0.3 mrad
- Effective optical laser output 45 %

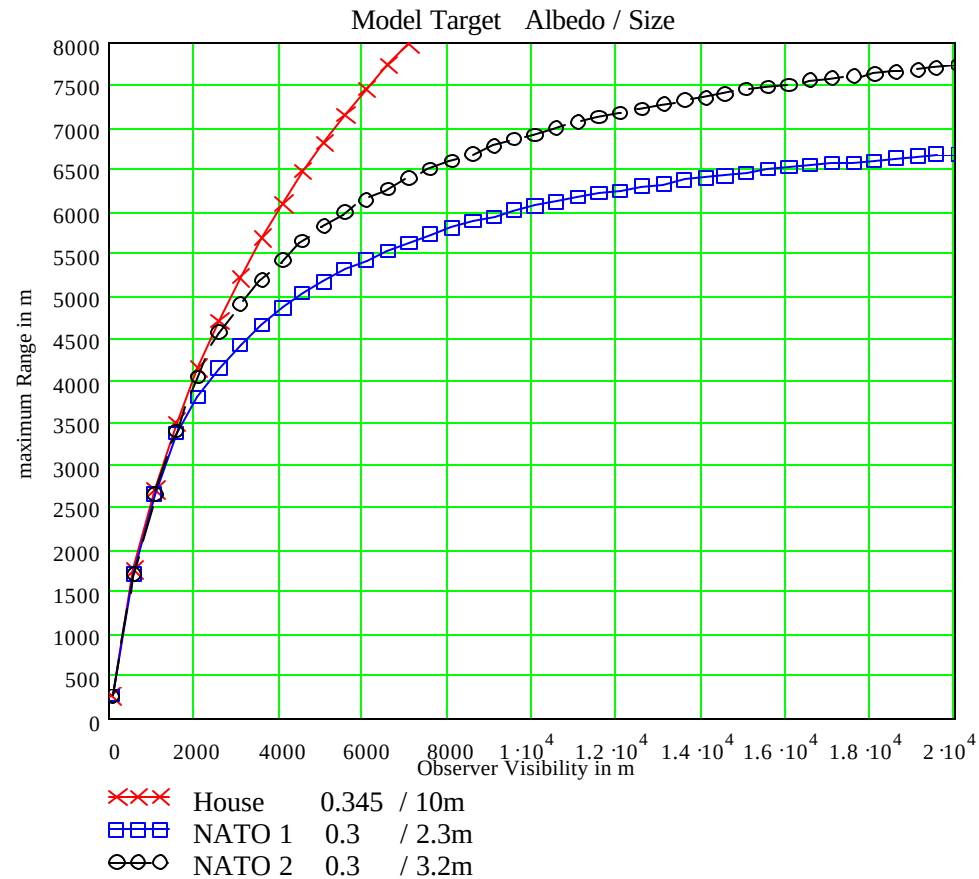
Irradiance in Target Plane (on scale) at 4 km



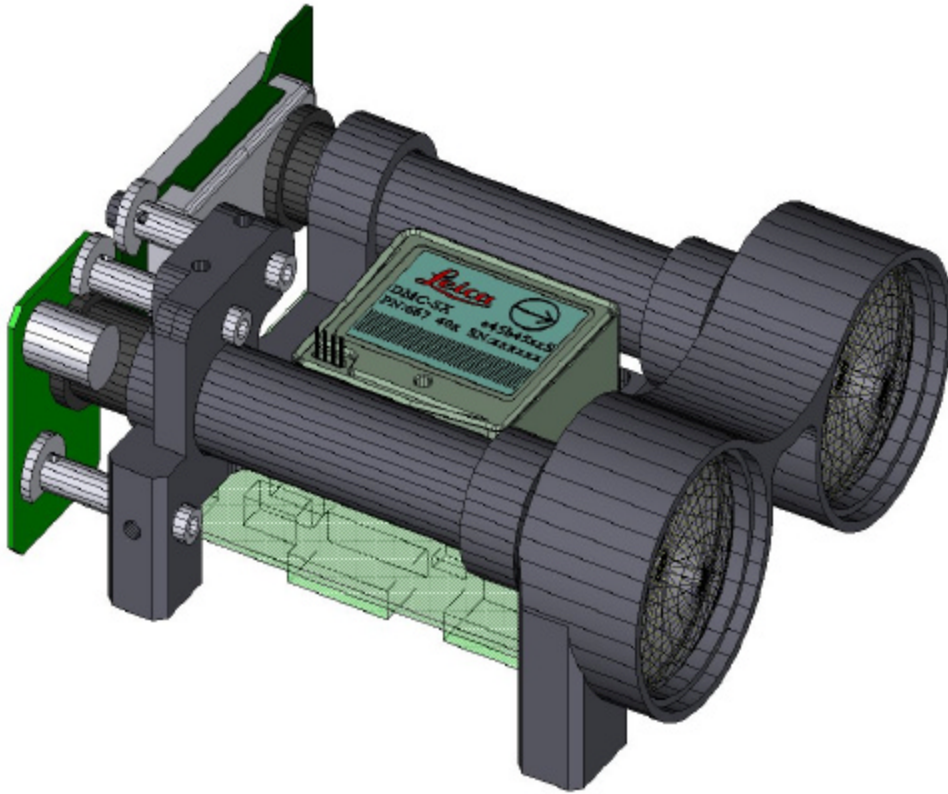
Range of VECTOR IV



Range of VECTOR with Beamshaper



Laser Rangefinder/Digital Magnetic Compass Module



Range

- Range 5 m up to 2500 m
- Wavelength 905 nm and 1550 nm
- Class 1 Eye Safe
(ANSI Z136.1-2000 & EN 60825-1 1994)

Heading & 2-axis tilt

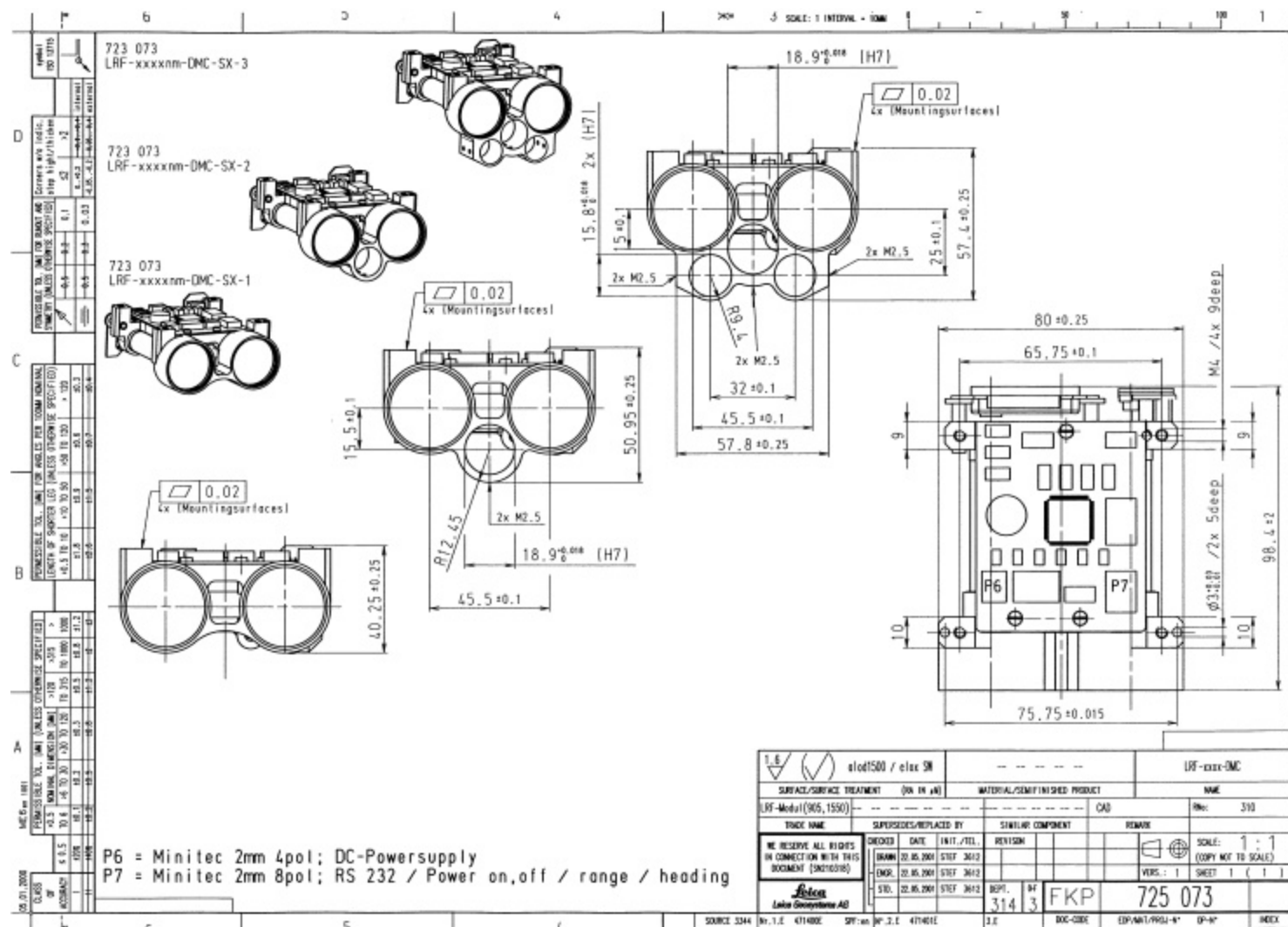
- Azimuth accuracy 0.5°, independent of elevation and bank positions
- Elevation and bank up to +/- 80°
- Built-in 3D magnetic compensation

Physical characteristics

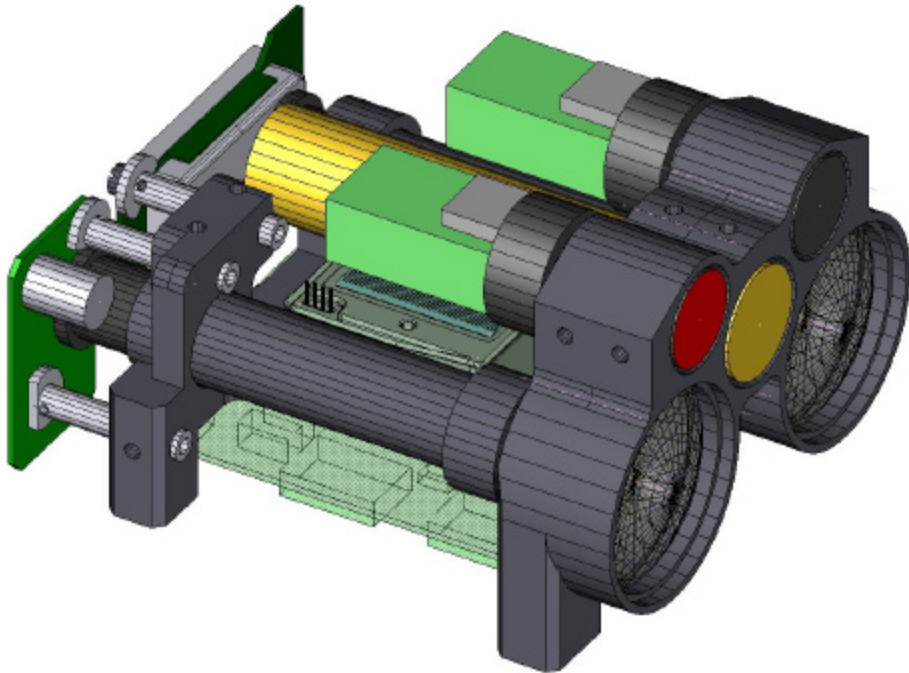
- L x W x H: 3.9 x 3.1 x 1.7 inches
- Weight (as shown): ≈ 8 oz.

LRF-DMC Module, Top View





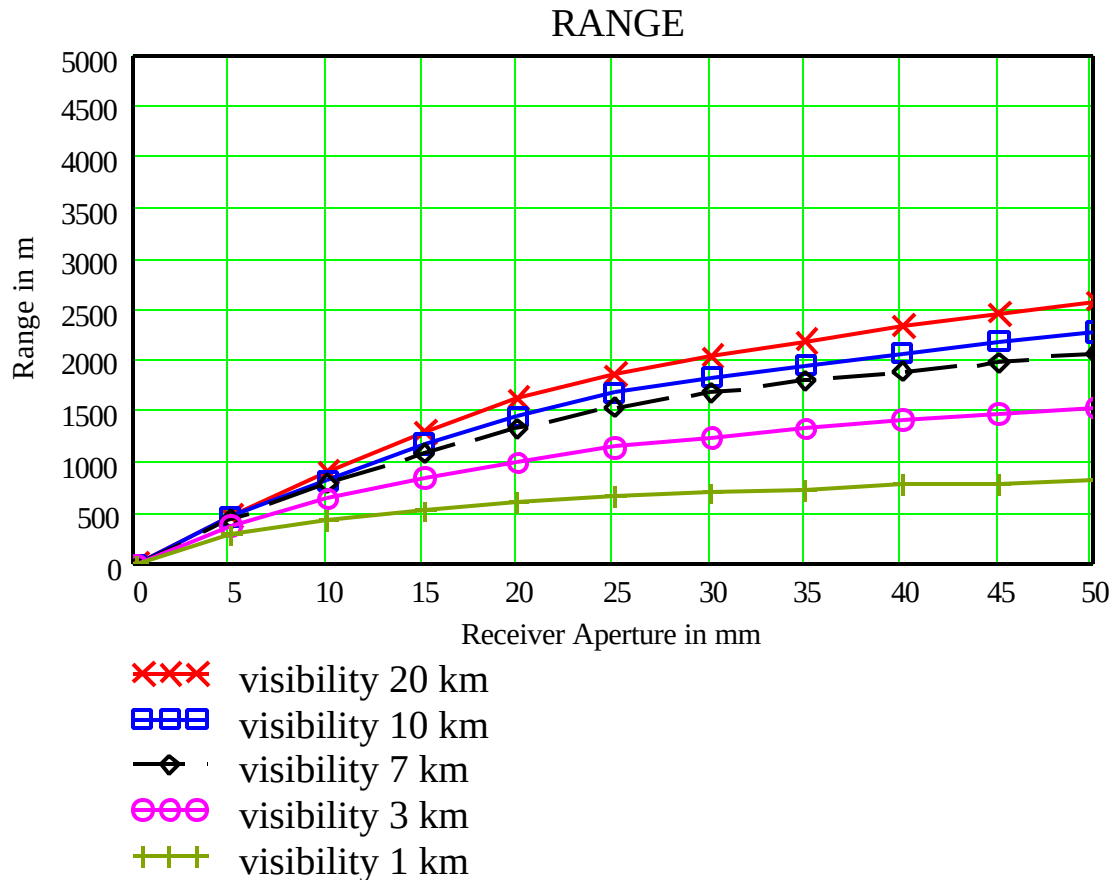
LRF – DMC Module with optional boresighted ports



- Laser Rangefinder
- Digital Magnetic Compass
- Pitch and Cant
- Digital Output
- Option example
 - Color video camera
 - B & W video camera
 - Laser pointer

Module Range versus Receiver Aperture

Target size 2.3 m (NATO), Albedo 0.1

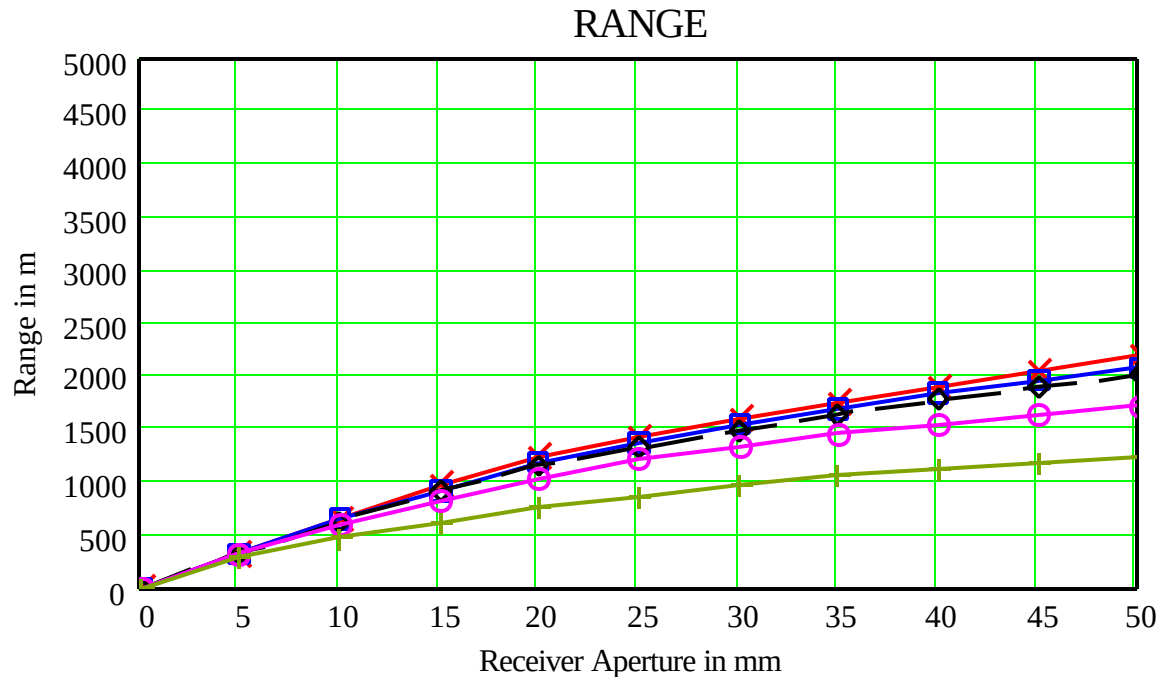


Wavelength: 905 nm

Beam Divergence: 0.4 x 1.3 mrad

Module Range versus Receiver Aperture

Target size 2.3 m (NATO), Albedo 0.1



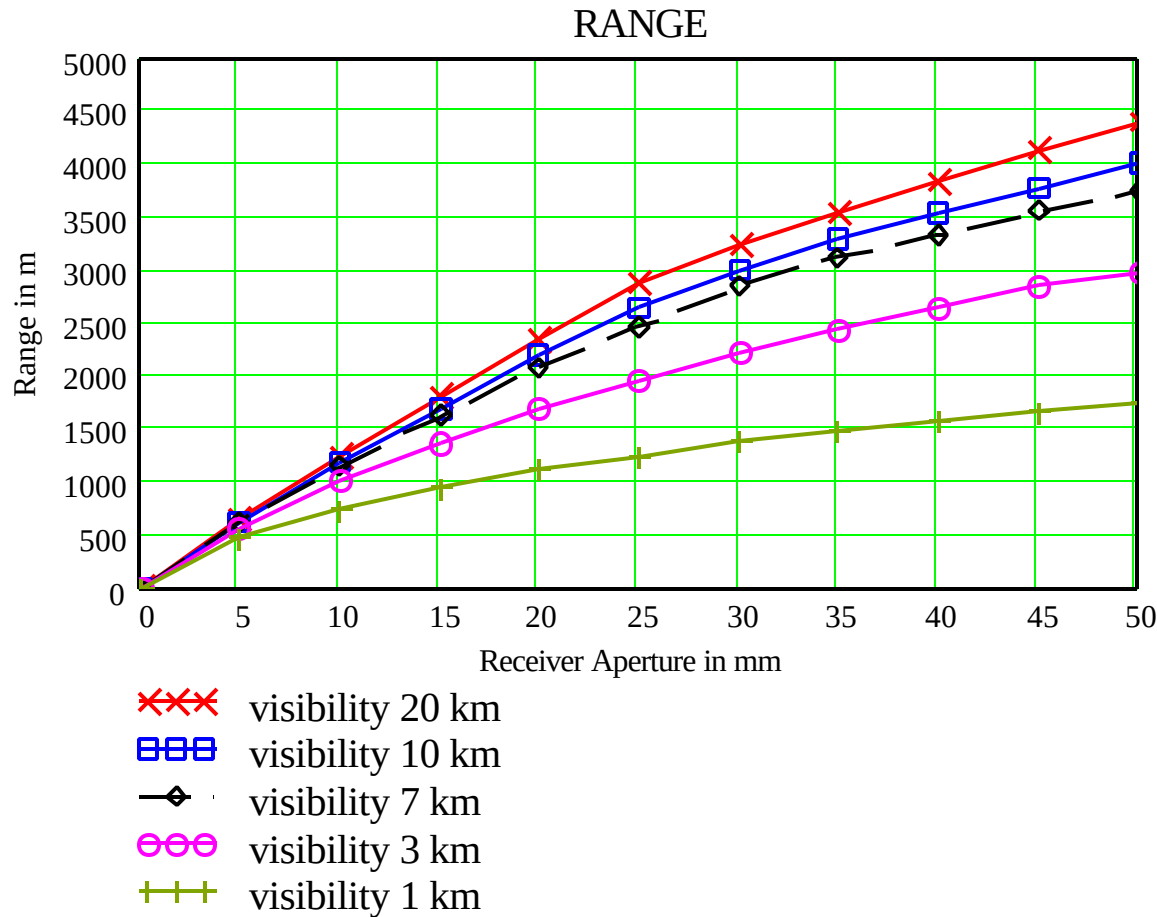
Wavelength: 1,550 nm

Beam Divergence: 2.0 x 2.0 mrad

- xxx visibility 20 km
- bbb visibility 10 km
- ◆— visibility 7 km
- ooo visibility 3 km
- +++ visibility 1 km

Module Range with Beam Shaper versus Receiver Aperture

Target size 2.3 m (NATO), Albedo 0.1



Wavelength: 1,550 nm

Beam Divergence: 0.7 x 0.3 mrad

Summary

- 4 X PLRFs in OT
- Range enhancement developed with beam shaper
- Beam Shaper imbedded in Viper ~ doubles range performance
- New LRF-DMC module developed
- Several module options available