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TAMRON Announces Development of LWIR 3X Compact & Lightweight Zoom Lens

May 17, 2013 – SPIE-DSS, Baltimore, USA.-Tamron Co., Ltd. (headquarters: Saitama City; President Morio Ono) announces a prototype LWIR (Long-Wave Infrared) 3X zoom lens, 35-105mm F/1.6 (Model #SC001) designed for VGA resolution FPA (Focal Plane Array) with 17 μ m pixel pitch in a compact and lightweight lens design.



SC001 Prototype

It covers a versatile focal length range of 35-105mm, equivalent to approximately 110-330mm in 35mm film format, with a constant maximum aperture of F/1.6 throughout the entire range. The lens provides excellent illumination characteristics from center to corner and incident angle to FPA optimally designed to minimize any adverse influence on shading to make the most of the 640 x 480 or 640 x 512 pixel arrays.

This is the third LWIR zoom lens from Tamron following the currently available 15-45mm F/1.4 and 35-105mm F/1.0 lenses that featured VC (Vibration Compensation), and is positioned to expand the horizon of indoor and outdoor surveillance applications for the security industry. Designed in a compact and lightweight chassis, its versatility in case of installation and system integration will shine. The lens comes with two types of coating on the front of the housing coupled with IP67-compliant construction; and the other with AR coating for indoor applications.

Mechanical dimensions of 82mm front diameter and 131mm barrel length from top to mount flange enhances its flexibility for camera integration for speed-dome-like configurations, not to mention conventional camera housing. With a gross weight of approximately 19.4 ounces (550 grams), the dynamic load on the electro-mechanics of pan & tilt drive is significantly reduced, which will ensure increased longevity of the pan & tilt system.

The dramatic downsizing and the resultant weight savings have been realized by Tamron's expertise in the motorized IF (Internal Focusing) zoom lenses, ranging from customer electronics to industrial vision applications that require demanding robust constructions.

Unlike typical conventional zooms lenses, the relative positions of zoom and focus groups are harmonized in conformity with a designated tracking curve, thus providing advantages in minimizing overall form factor of the optical system without sacrificing the performance at any point of its focal length range. Indeed, the four-element construction zoom delivers outstanding image quality even when compared with commonly used fixed focal length such as 35mm, 50mm, and 100mm lenses.

Serial interface is employed for communication for controlling the focus and zoom in RS232C, which facilitates an integration with a majority of camera systems. Both lens groups are activated by stepping motors to ensure positional accuracies built into an electro-mechanical architecture to ensure high level of reliability and durability.

Another attribute, which is incorporated because of the electro-mechanical IF zoom construction stated above, is Active Athermalization, an adaptive back focal distance adjustment subject to temperature conditions in and out of the housing, while detecting changes in local regions of the lens barrel. This is an independent feature from the deicing heater to be equipped on the barrel closest to the front element.

The new 3X is scheduled to be in production toward the end of 2013.

Main Specifications

(1) Optical	
Spectral Range	8~14 μ m
Focal Length	Wide : 35mm
	Tele : 105mm
F-No.	F/1.6 Constant
Zoom Ratio	3X
Optical Construction	4 groups/4 elements
Effective Image Circle Dia.	ϕ 14.5mm
Image Pick-up Device	VGA (640X512); 17.0 μ m pixel pitch 10.88mm X 8.7mm
	Uncooled, microbolometer FPA
Back Focal Distance	Wide : 28.2119mm (in Si t=0.66mm)
	Tele : 28.1075mm (in Si t=0.66mm)
Optical Track Length (Apex of front element~Image Plane)	139.3mm
Exit Pupil Position	Wide : -112.5mm Tele : -113.1mm
MOD (Min. Object Distance)	Wide : 7.0m (~from apex of lens front)
	Tele : 7.0m (ditto)
Optical Distortion @MOD ※ 1	Wide : -2.98%
	Tele : +0.56%

Relative Illumination	Wide : 94.7% Tele : 72.5% @100% Image Height (7.25mmr)
FOV (H-V-D)	W: 17.97°, 14.33°, 23.13° T: 5.93°, 4.75°, 7.56°
Focusing System	Internal Focusing System

(2)Electro-Mechanics		
Dimensions	Length	131mm
	Max. Barrel Dia.	φ82mm
Weight	550g (estimated)	
Zoom Group Control	Stepping motor (2 phase excitation)	
Focus Group Control	Stepping motor (1-2phase excitation)	
Active Athermalization	TBD (Within depth of focus)	
Water & Dust Proof	IP67	

※All design elements and specifications are subject to change without notice.