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TECHNOLOGY MANAGEMENT**

SPECIFICATION

**Sentrand Machine Vision Laboratory: Specialised
Tools, Instruments, Machinery and Equipment**

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1 SCOPE

1.1 IDENTIFICATION

This document describes tools, instruments and equipment needed to develop and utilise the Machine Vision (MV) laboratory at the Sentrarrand Kraal. This laboratory consists of a platform with three existing buildings, asset numbers 02AK213J (Machine Vision Integration Room), 02AK214J

(Store Room and MV Development workshop) and 02AK215J (Locker room and Kitchen). Also part of this facility is 4 railway lines that run parallel to this platform and buildings.

2 BACKGROUND

The Condition Assessment Technologies (CAT) section has already taken occupation to build and develop a Machine Vision Laboratory at the Sentrarrand Kraal. This facility shall be a worldwide leading facility where Machine Vision Concepts will be developed, tested and evaluated that in turn can solve many of Transnet's railway problems. In the past, these buildings have served a purpose for storing and loading of goods and live stock into wagons.. Since the scope has now totally changed, the facility must be upgraded and stocked with the new requirements as stated throughout this document.

3 ITEMS REQUIRED

3.3 MACHINE VISION INSTRUMENTS

All Machine Vision instruments shall be ultra high industrial quality. CAT shall approve all Items before purchase. Incorrectly supplied items that do not adhere to the standards shall not be accepted by CAT.

3.3.1 1 x imaging storage system shall be able to store at least 1 million images. Each image is approximately 6000 Bytes in size. The transfer rate shall be greater than or equal to 3GBits per second. The system shall also be able to store at least another 100 000 images at the same transfer rates in harsh conditions of movement.

3.3.2 1 x MV still image capturing system shall be able to acquire images of stationary components at ultra high resolutions by manual or external triggering. At least 24 effective megapixels. Full 35mm full film imaging CMOS sensor. Colour modes shall be SRGB. Long exposure capability longer than 1 second with ISO set to 1600 and greater. Creative styling shall include at least Standard, Vivid, Neutral, Clear, Deep, Light, Portrait, Landscape, Sunset, Night View, Autumn Leaves, B&W, Sepia. D Range optimizer with at least Mode: off, Standard / Advanced Auto / Advanced Level; Advanced Level setting: 5 levels; DRO advanced bracketing: 3 frames, H/L selectable. White balance capability with at least Automatic, Preset (Daylight, Shade, Cloudy, Tungsten light, Fluorescent light, Flash), Colour Temperature (2500 - 9900k with 19-step Magenta / Green compensation), custom. The system shall have an ultra fine imaging stabilizer with at least a 3 inch 100% field viewer (extra fine 921 600 dots). The system shall have an AF feature with at least Single-shot AF (AF-S),

Automatic AF (AF-A), Continuous AF (AF-C), Direct Manual Focus (DMF), Manual Focus (MF) focus modes. The sensitivity shall be 0EV - 18EV, ISO 100 equivalent with a range of at least 1 – 7 meters. The system shall be able to accept external lighting sources and be able to trigger them. The system's shutter shall be Electronically-controlled, vertical-traverse, focal-plane type shutter. Shutter speed shall be adjustable and shall be rated at least 1/8000 of a second. The system shall contain continuous shooting features of at least 5 frames a second. The system shall contain an interchangeable fisheye lens. The system shall also have a robust casing for transport of the system. The system shall be able to locally store at least 5000 still frames of 6000 bytes each at ultra high transfer rates.

3.3.3 1 x MV moving image capturing system shall be able to acquire images of rapid moving components at ultra high resolutions by manual or external triggering. Recording resolution shall be high definition with at least 8 megapixels. The system shall be able to understand MPEG-2 and MPEG-4 AVC / H.264 formats. The system shall have at least a 12x optical built in zoom. The system shall be able to smooth record (3 seconds). The system shall have an ultra fine imaging stabilizer with at least a 3.2 inch 100% field viewer (extra fine 921 600 dots). The system shall have built in lighting with ability to accept external lighting devices with external triggering. The system shall be able to locally store at least 50 000 moving frames of 6000 bytes each at ultra high transfer rates. The capturing device part of this system shall be small in size length 135mm x 75mm x 75mm and weigh less than 550 grams. The system shall be able to operate for at least 8 hours full functionality with quick recharge turn around times. The system shall be complete with cleaning kits as well as robust casings for transport purposes.

3.3.4 1 x MV imaging system viewer. The system shall be able to view ultra high definition images of at least 137cm with 2 megapixel resolution. The system shall be able to scan through images at a rate of 200 frames a second with no flickering. The system shall have RGB back light enhancement with true deep black colour. The system shall have a viewing angle of at least 178 degrees. The system shall be able to display at least 1024 shades of colour. The system shall be able to interface to external devices such as USB 2 devices. The system shall have Ethernet and HD15 PC input connectivity as wells as the ability to expand. The system shall be able to be partitioned to view more than one image at a time from multiple input sources. The system shall be able to automatically adjust ambient light constraints. Any help menu shall be easy to operate with minimal complications.