The use of Thermal Imaging in Packaging and Postal Applications
All major industries are seeking to reduce their operating costs while striving at the same time to improve Quality of Service and Customer Satisfaction. Postal Services worldwide are no different and have seen a steady increase in automation over recent years. The quality of service is becoming linked more and more to the performance of the handling machinery. Planned Preventive Maintenance regimes can predict the imminent failure of critical components such as bearings and switchgear, and thus enable the appropriate maintenance to be carried out before complete breakdown; this reduces the impact on equipment downtime and profits.

Predictive/Preventive Maintenance
Over recent years advances in instrumentation technology, and the requirement to reduce operational costs and increase operation efficiency, has resulted in the more progressive industries abandoning traditional routine maintenance programs in favor of condition monitoring and predictive maintenance strategies.

Conventional maintenance programs are driven by equipment failures or by the regular, but often arbitrary 3, 6 or 12 monthly, routine maintenance. Little attempt is made to monitor equipment performance or to track historical maintenance information; little is therefore achieved in terms of minimizing the equipment downtime, extending the useful life of the equipment or reducing the overall lifecycle costs. In part this is due to either the unavailability or affordability of the necessary instrumentation.

The appropriate instruments such as infrared temperature monitors and vibration analyzers are now becoming available. Handheld equipment can be used to simply check the condition of critical equipment; microprocessor based versions of these instruments are increasingly being used to provide continuous condition monitoring. Trend analysis can in many circumstances be more important than for example, a spot absolute temperature measurement. Those organizations employing these strategies are already reporting dramatic reductions in operational downtime and costs and as a result are predicting increased capacity, improved quality of service and increased returns on investment.

Thermography
There are a variety of sensing technologies which are being applied to locating specific faults in the components of Integrated Mail Processors. The most flexible of these (which include Thermography, Vibration analysis and Acoustic Emission) is Thermography which is used to detect faults in circuit boards, bearings, switchgear, electrical connectors and belt alignment.

Thermal imaging is the technique used in thermography for creating an image of a scene based on the invisible thermal radiation emitted from an object. This technology lends itself to detecting faults in mechanical or electrical equipment.

Infrared thermography is one of the most important sensing technologies to be

applied to the detection and monitoring of manufacturing and production equipment. Until recently this sophisticated technology was prohibitively expensive, being driven primarily by military applications; over the last few years, however, the technology has improved and it has been introduced to high volume commercial and professional applications by innovative companies such as Wahl. This has bought the price down to a level which is opening up a host of new applications.

Thermal imagers measure the infrared energy emitted by surfaces remotely and are consequently extremely simple to operate as no physical contact is necessary. Many facilities have employed thermographers to carry out inspections every 6 or 12 months; the cost of the equipment and its ease of use mean that these inspections can now be carried out as and when required by the organizations own maintenance staff. Appropriate thermal imagers no longer need to cost $45,000 or more; for example the comprehensive range of imagers from Wahl starts from less than $2,500 – less than the cost of a single survey from a thermographer.

On-Line (and Independent) Condition Monitoring

Sensing technologies are now being routinely applied to existing machines; stand alone and hand-held monitoring equipment is making a major impact on equipment reliability. The overall effectiveness of this approach is influenced by the adoption of optimal sampling rates for the appropriate components and equipment and by the development of robust predictive algorithms for the system as a whole. Independent condition monitoring technologies are now being introduced to reduce the scale of the data analysis task; this involves the deployment of multiple networked sensors – fusing data from several sensor sources in order to better predict and plan maintenance events.