



Figure 2. A Picture Taken Looking Along a Pipe is distorted (warped) by the combined effects of the lens and the viewing geometry (left). The image data are processed to unwarped the image (right), yielding an undistorted radial view.

pensates for the decrease in illumination with distance from the ring of LEDs.

The potential advantages to be gained from the development of this system are best understood in comparison

with visual pipeline-inspection systems in current use. Almost all of those systems offer unprocessed video images for viewing by humans in real time or in post-inspection playback. The fatigue induced by

long viewing of mostly featureless images makes such inspection somewhat unreliable, and cost of labor for such inspection is high. If, as planned, the present system could be enhanced by use of additional computer vision techniques, then visual inspection of pipelines could be promoted to supervised inspection, which, in turn, could be a precursor to partly or totally automated inspection. According to one scenario, a system derived from the present one would provide enhanced graphical displays, possibly with highlights on potential defects, and could even provide audible alarms to alert operators. Operators could then concentrate their attention on pipeline sections most likely to contain defects. Reliability of pipeline inspection would thus be increased and the cost of labor reduced.

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## Shuttle-Data-Tape XML Translator

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JSDTImport is a computer program for translating native Shuttle Data Tape (SDT) files from American Standard Code for Information Interchange (ASCII) format into databases in other formats. JS-DTImport solves the problem of organizing the SDT content, affording flexibility to enable users to choose how to store the information in a database to better support client and server applications. JS-DTImport can be dynamically configured by use of a simple Extensible Markup Language (XML) file. JSDTImport uses this

XML file to define how each record and field will be parsed, its layout and definition, and how the resulting database will be structured. JSDTImport also includes a client application programming interface (API) layer that provides abstraction for the data-querying process. The API enables a user to specify the search criteria to apply in gathering all the data relevant to a query. The API can be used to organize the SDT content and translate into a native XML database. The XML format is structured into efficient sections, en-

abling excellent query performance by use of the XPath query language. Optionally, the content can be translated into a Structured Query Language (SQL) database for fast, reliable SQL queries on standard database server computers.

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## Highly Reliable, High-Speed, Unidirectional Serial Data Links

**Forward error correction would afford reliability in the absence of retransmission.**

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Highly reliable, high-speed, unidirectional serial data-communication subsystems have been proposed to be installed in an upgrade of the computing systems aboard the space shuttles. The basic design concept of these serial data links is also adaptable to terrestrial use in applications in which there are requirements for highly reliable serial data communications.

The hardware and software aspects of the architecture of the data links are dictated largely by a requirement, in the original space-shuttle application, for one computer to monitor the memory transactions and memory contents of other computers in real time with high reliability and without reliance on requests for retransmission. To minimize

weight while affording a capability to transfer data at a required rate of  $2.56 \times 10^8$  bits per second, it was decided that the links would be serial ones of the fiber-channel type. ["Fiber channel" denotes a type of serial computer bus that is used to connect a computer (usually a supercomputer) with a high-speed data-storage device. Depending on the spe-