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**Session 1A: Medical and Diagnostic Applications**

**The Buffer Diagnostic Prototype:  
A Fault Isolation Application Using CLIPS**

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This paper describes problem domain characteristics and development experiences from using CLIPS 6.0 in a proof-of-concept troubleshooting application called the Buffer Diagnostic Prototype.

The problem domain is a large digital communications subsystem called the Real-Time Network (RTN), which was designed to upgrade the Launch Processing System used for Shuttle support at KSC. The RTN enables up to 255 computers to share 50,000 data points with millisecond response times. The RTN's extensive built-in test capability but lack of any automatic fault isolation capability presents a unique opportunity for a diagnostic expert system application.

The Buffer Diagnostic Prototype addresses RTN diagnosis with a multiple strategy approach. A novel technique called "faulty causality" employs inexact qualitative models to process test results. Experiential knowledge provides a capability to recognize symptom-fault associations. The implementation utilizes rule-based and procedural programming techniques, including a goal-directed control structure and simple text-based generic user interface that may be re-usable for other rapid prototyping applications. Although limited in scope, this project demonstrates a diagnostic approach that may be adapted to troubleshoot a broad range of equipment.