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**EXPANDED PROJECT LIST ADDENDUM**

***(Projects listed chronologically – recent work first.)***

**Industrial Cyber Security**

* Co-developed a NIST SP.800-82 based Industrial Control Systems (ICS) Cyber Security audit/assessment framework. Applied said plan in audits at four Verso Corporation operating facilities identifying potential incursion risks, malware susceptibility, and inadequate recovery procedures. Presented remediation policies and procedures to correct the identified risks and limit potential production losses. ***(2015-2017)***
* Co-Team leader for a corporate wide (8 operating facilities) Industrial Control Systems’ project to upgrade aged unsupported Windows Operating System versions. (e.g. Servers: Windows 2000 & 2003 migrated to 2008 & 2012; Workstations: DOS, Windows 98, Windows XP to Windows 7) ***(2015-2017)***
* Designed a backup and recovery strategy incorporating existing practices, backup utilities, and imaging software that would allow recovery of failed or compromised control systems. Where possible, bare metal restore on disparate hardware was defined. ***(2015-2017)***

**Networking**

* Coordinated a combined multi-vendor and Verso team that developed a Converged Plantwide Ethernet(CPwE) process network architecture employing the Industrial DeMilitarized Zone (IDMZ) concept championed by Rockwell Automation and Cisco. ***(2015-2017)***
* Diagnosed a lack of segmentation as the process control network fail point affecting the startup of Consolidated Papers No. 35 Paper machine. (This was the pre-switched ETHERNET era. The combined 10BASE5 and 10BASE2 network had been installed as a single segment.) Applied Ethereal (now: Wireshark) to analyze and diagnose the problem. Introduced corporate engineering to segmentation solutions already implemented by Research and Development Process Control which in turn, allowed the paper machine to proceed into operation. ***(1995)***
* Designed, installed, and maintained Consolidated Papers' first combined Process/Business file and print ETHERNET network spanning three geographically separate paper mills plus the Research and Development facility. The design was a combined 10BASE5, 10BASE2, and RS-232 infrastructure originally running DECnet, DEC Pathworks, and Novell on OpenVMS, DOS, and early Windows based systems. I continued support, expansion, and migration to evolving Windows protocols and operating systems eventually turning this foundation over to Corporate IT as they assumed corporate-wide networking responsibility. ***(1988-1994)***
* Led Team that designed, installed, coded, and maintained Consolidated Papers' first complex serial inter-computer process networks -- pre- and post- RS-232 configurations. Continued support of these systems until leading their conversion to ETHERNET based Process networks when that technology became available and was deployed. ***(1977-1988)***
* Wrote Consolidated Papers' first communication interfaces between vendor (Honeywell, ABB, BAILEY, and IMPACT) and the Corporation’s proprietary control and historian systems. The mixed serial and TCP/IP socket interfaces were combined to build inter-computer serial and ETHERNET networks for data acquisition and closed loop control. ***(1977-1988)***

**Industrial Control Systems (ICS)**

* Led a Rapid Lean Six Sigma process improvement project resulting in the conversion of an aged DCS system (Bailey INFI90) to Rockwell ControlLogix® ***without*** modifications of any field wiring. The team implemented control of the NewPage Research and Development Division Pilot Coater. This project was completed 40% below original budget estimate. The new installation ran successfully on its *first* post-implementation coating trial. ***(2010)***
* Designed, programmed, and implemented a three paper machine Stock Preparation and blending control system for Consolidated Papers Whiting Mill. The software controlled a mixed blending of pulp and additive flows via a percentage based ratio of the total flow required to maintain a specific level in each paper machines’ Mix Tub. Control incorporated a second targeted level of the upstream Machine chest as the primary control limit and feedback to the Mix Tub loops. System also provided the first production use of CRT based protected screens as Operator Workstations. Automatic flow calibration and grade change with advanced setup were also part of the package**. *(1981-1982)***
* One of three System Engineers in a team of equals. The team created -- designed, developed, coded, implemented, and maintained -- Consolidated Papers’ second generation of proprietary real-time Process Control systems. At peak, there were two IBM Systems/7 and sixteen separate IBM Series/1 systems in five facilities running 24/7/365 while executing proprietary control algorithms for: Basis Weight, Moisture, Color, Wet End (Total Head, Total Flow, & Slice), Speed, Stock blending, Lab profile gauging, plus Automatic Speed & Grade Changes, Data acquisition and control was communicated through a complex serial (RS-232) network of connected proprietary and vendor systems as well as the traditional analog & digital field wiring. Operator workstations were a mix of true graphic terminals and proprietary multi-tasked C code based operator interfaces running on Windows PCs connected via serial links. Operator interfaces were fully interactive with real time display updates.Before their retirement, the Series/1s were connected to OpenVMS VAX and Alpha systems thus feeding their process data onto the nascent ETHERNET networks ***(1979-1990)***
* Led a Consolidated Papers combined Research and Instrumentation Team in developing and implementing an industry first micro-processor based scanning gauge profile data acquisition system. The Fabri-Tek MP-12 micro-computer (a PDP-8 clone) was a front-end processor for the asynchronous inputs from seven separate scanners on six machines. Collected data was communicated to the Mill’s IBM 1800 mainframe control system using a proprietary digital I/O serial communications scheme. ***(1977-1978)***
* Responsible 24/7/365 for Consolidated Papers Wisconsin Rapids Division first generation mill-wide process control system encompassing four paper machines. The system executed proprietary control algorithms for: Basis Weight, Moisture (multiplexed), Color, Wet End (Total Head, Total Flow, & Slice), Speed, and Automatic Speed & Grade Changes. The system also processed -- as background tasks -- scanning gauge profile displays, the Mill's entire Production Inventory Control database with related reporting, and software development. While serving as Process Control Supervisor I re-wrote the profile sampling algorithm to 40% of its original size, implemented a cross-mill messaging system, developed a “warmstart” capability to allow ‘bump-less’ return to control after system outages, installed a computer room environment monitoring and warning system, and led the upgrade of the system to its full hardware capacity. ***(1976-1979)***
* Served as a member of Consolidated Papers' Year 2000 team. My focus was Real Time Complex systems - networks of computers and their possible Y2K interaction between one another. I led the monthly corporate Team meetings between vendors and the specific mill groups the vendor systems would impact. ***(1998-2000)***

**Process History and Data Analysis**

* Installed, configured, and maintained multiple vendor dependent OPC servers and OPC bridges at eight of Verso Corporations (f/ NewPage Corporation) facilities. Connected said OPC servers to the facilities' respective process and profile Historians. ***(2000-2015)***
* Designed, created, installed, configured, and maintained a serial communication based Star network for Consolidated Papers’ Biron Mill that acquired profile, process, and laboratory test data from the entire No. 26 paper machine line. Data was maintained in a process and profile database then offered as real-time and historical displays on proprietary multi-tasked C code based operator interfaces. Connected via serial links, the Operator interfaces were fully interactive with both historical and real time displays.  
   ***(1986-1989)***
* Designed, created, installed, configured, and maintained, the first combined Process and Profile Historian installations at three different operating divisions. Users could create ad hoc displays for any time span, record them, and then schedule their execution for any minute of the day. When vendor solutions became available I installed, configured, maintained, and upgraded replacements while adding additional installations at four other facilities. I also trained operating and management personnel on methods to process and visualize the mass of process data recorded in the Historians to problem solve and gain production insights. ***(1981-1984)***
* Developed an off-line scanning gauge profile certification system employing a lab gauge certified Mylar strip as a repeatable profile standard. Performed cross-correlations on demand of the standard profile and currently measured or past saved certification profile history for the subject scanner. This test methods eventually evolved to calibrate basis weight, moisture, and gloss on all on-line scanning fames installed at Consolidated Papers. I supported the dedicated Calibration Team that evolved from this project.  
  ***(1977-2001)***
* Designed, developed, and installed Consolidated Papers' first Paper Test Lab Entry Database and Reporting system. The system ran on the mill’s process control mainframe and recorded all test data for three paper machine lines. Results were reported by machine line, shift, day, week, month, and grade with basic statistical analysis applied. ***(1975-1976)***
* Created the first CRT based graphics displays of real-time profile -- scanning gauge -- data for Consolidated Papers. Later I built on that experience creating a graphic primitives function and subroutine library for the company’s proprietary networked C code based multi-tasking Operator display PCs. ***(1974)***
* Created the first automated Pulp Mill reporting system for Consolidated Papers. Maintained a database of Daily Digester production and KAPPA Number. Displayed the data in a printed graphical format. ***(1974)***

**Systems, Network, and Laboratory Administration**

* Consolidated Papers’ System Administrator at the Research and Development Division. I supported the ETHERNET network segment across R&D’s laboratories, test instruments, Process Control development, and business (file, print, and user workstations). At its peak, 120 devices, servers, users, and lab instruments running a mix of operating systems. ***(1990-1994)***
* Developed, implemented, and supported five automated Multiple Test Instruments and installed them in four Mill Paper Test Labs as well as the Research and Development Division. Test data was interfaced with the Mill Historians. ***(1984-1990)***