My background is in the Electronic Computer Aided Design (ECAD) industry. From 1982–1990 I was responsible for the physical layout of electronic designs. I used ECAD tools from Intergraph Electronics. I eventually went to work directly for Intergraph. Within these ECAD tools were features known as session recorders.  The session recorders were used to capture the keyboard and mouse events then store the results in a journal file for playback. The benefit of this was primarily for customer support, but also for testing. Shortly after joining Intergraph, we purchased Daisy Systems of Israel, and Cadnetix of Boulder, CO (DAZIX). Some of the personnel from Daisy (including the President/CEO) went on to form what is now known as Mercury Interactive.  Most people may not realize that the Test Automation industry evolved from the CAD industry.

While at Intergraph, I was assigned to a product line MCM Engineer (Multi-Chip Modules) of which I was responsible for the testing and quality. Meanwhile Mercury was busy developing Xrunner. During this period the test team at Intergraph developed their version of Xrunner with XRecord from MIT (Xpatrol). At this stage we went beyond session recorders and started developing test automation tools that could be reused across the enterprise. As a note Cadnetix had developed a test framework that was action based but only worked on Cadnetix products.

For the last 18 years I have concentrated on Software Quality Assurance, Testing and Test Automation.  I was the beta site while at PAYCHEX for Mercury's TestDirector version 1.5 on Windows 3.11 (1994). I co-wrote the press release for version 4 of TestDirector (1997). I have worked at both of Mercury's largest accounts in the United States, PAYCHEX (East) and QWEST (West). The last 7 years I have been working on the 4th generation test automation framework and structured test method TestFrame.  I have developed frameworks from the ground up with WinRunner and TestDirector. I have also used Mercury's latest offering Business Process Testing (BPT) with QuickTest Professional and Quality Center (2004).  While at QWEST we were a beta-site for Mercury's Business Process Testing. BPT is essentially a TestFrame clone, not as flexible as TestFrame, and only works with QuickTestPro.

I have certifications in TQM, CMM, and software quality assurance. My main interests are structured testing, test automation, and the efficiency of testware.

Throughout my career I have worked in the following industries:

- Aerospace;

- Automotive;

- Broadband;

- Computer Aided Design;

- Energy and Utilities

- Electronics;

- Financial Services;

- Health Care;

- Imaging;

- Industrial Automation;

- Payroll;

- Public Sector;

- Publishing (Internet);

- Telecom;

- Transportation;

- Travel (Online);

- Wireless.

From my 25 years of experience with session recorders, test automation, frameworks and STM's there is nothing that compares to 4th generation frameworks in terms of architecture, methodology, efficiency and portability.

Currently I am working with a 5<sup>th</sup> generation test automation solution, otherwise known as scriptless.

Fourth generation test automation frameworks were invented by CMG at the TestFrame Research Centre in the Netherlands around 1994 by
Hans Buwalda [i]

Currently I am working with a 5th generation test automation solution, otherwise known as scriptless.

Fourth generation test automation frameworks were invented by CMG at the TestFrame Research Centre in the Netherlands around 1994 by
Hans Buwalda [i]

Hans is the primary inventor of TestFrame and the actionword technique. Some explanation of inferred principles (test automation progression);

- 1st Generation – Record and Playback
- 2nd Generation – Use/reuse of functions in test scripts
- 3rd Generation – Data Driven scripts/functions
- 4th Generation – Action Based (keyword) scripts/functions
- 5th Generation – Scriptless automation.

[i] TestFrame Test Design and Automation, Hans Buwalda, 1999