The Technology:

Over the past decade, researchers and clinicians at NASA have developed and implemented, on one software platform, several hundred different advanced electrocardiographic (ECG) parameters that have been shown in the scientific literature to better predict the presence or absence of heart diseases than conventional ECG tests. These researchers have also obtained and analyzed thousands of electronically stored 12-lead ECG files from collaborating hospitals and clinics around the world, including recently from cardiologists in Auckland, and then employed pattern recognition procedures on the stored data to select those 'small teams' of advanced ECG parameters that together most accurately predict the presence versus absence of various heart diseases." In other words the researchers have utilized previous patients' ECG data to "paint a more accurate picture" of what coronary artery disease and other heart conditions "look like" on simple, resting, noninvasive "advanced ECG" (A-ECG) tests.

The above process has now led to the generation and daily clinical use of a large software database of signal processed advanced ECG information from both healthy individuals and from patients with known heart diseases as proven by "gold standard" imaging studies such as cardiac catheterizations, nuclear imaging tests, cardiac MRI scans, etc. Unfortunately these imaging studies are often unnecessarily invasive and/or prohibitively expensive, especially for routine use in disadvantaged communities. Today, however, using simple "A-ECG scores" generated from performing data mining on this large ECG large database, clinicians from Auckland are now able to apply, in a very inexpensive and completely noninvasive way, the knowledge learned from the prior patients in the database to *new* patients whose cardiac status is currently unknown. And most importantly the Auckland-based clinicians can also now use these simple ECG tests to, with good accuracy, predict the presence or absence of several different cardiac diseases, including coronary artery disease and certain life-threatening genetic heart conditions that might otherwise remain "hidden" when clinicians only have conventional 12-lead ECG information. Importantly this can also be done either locally or remotely. Moreover even in individuals who are deemed to be "heart healthy" by these tests, the same software can also estimate a "heart age" ("ECG age") and compare that to the patient's true chronological age. This secondary test for "heart age" in outwardly healthy individuals is often very helpful in facilitating community health education through motivating patients with cardiac "risk factors" to begin making appropriate and sometimes radical lifestyle adjustments to help prevent cardiac diseases and events in the future. For more detailed scientific information on the use of A-ECG tests in cardiac disease detection, refer to the following publication, which is freely available online: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2894002/

Dr. Todd Schlegel, MD
Former NASA Flight Surgeon

Dr. Patrick Gladding, MBChB, FRACP, PhD
Cardiologist, North Shore hospital