LOCKHEED MARTIN

ATL

Advanced Technology Laboratories

History

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ATL has more than 80 years on the frontline of applied research and development, from pioneering the fundamentals of television in the 1930s and 1940s, to creating polymorphous computing architectures and autonomous technologies for unmanned systems today.

We have a legacy of cultivating technologies that make possible some of the most sophisticated systems worldwide. We are an unparalleled resource of advanced-computing technology and software development demonstration, and transition.

ATL HISTORY – 1930s

In 1929, a group of GE engineers joined RCA to work on recording sound on motion picture film and to develop television technology. Among them was Dr. Edward Kellog, who helped found the Photophone Development group.

Known later as the Advanced Development group, it formed the nucleus of today's Advanced Technology Laboratories.

Today, we recognize Kellog as a pioneer in recording-motion-picture production and TV development. He amassed 47 patents and was a leading participant in work that won two Academy awards — one in 1941 for the design of a special multi-track printer and reproducer for Disney's film classic Fantasia and one in 1951 for pioneering low-noise, direct-positive recording of sound on film.

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ATL HISTORY – 1940s

Prior to World War II, we used dry galvanometer technology to develop sound-powered telephones and amplification systems for shipboard communication.

Sailors no longer had to shout through brass tubes to be heard below decks. For our soldiers during World War II, we developed infrared signal receivers and "snooperscopes" to produce more accurate battlefield assessments.

Back at home, we were developing tri-color kinescopes, vidicon tubes, and image orthicon tubes—all of which made color television possible. We later received a patent for a color selective reflector for color TV cameras. The reflector, which divides images into three colored beams, is still used today.

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ATL HISTORY – 1950s

We developed the optical system for the first commercial color TV camera, which went on the market in 1951. Shortly afterward our 16-mm film scanning system and 35-mm projector gave broadcasters the ability to transmit color movies to home TV sets across the nation. But not all of our successes were TV related.

We helped pioneer the move away from optical to magnetic recording on film and, by the end of the decade, we were developing recorders for America's fledgling space program. Meanwhile, emerging requirements for satellite-borne equipment meant the development of compact circuitry with low power requirements.

By 1955, we delivered transistorized microphone preamplifiers to the Air Force. These devices were the service's first use of transistor technology. For the Army, we installed the largest electronic data-processing system ever built at that point in time. And by 1957, we used germanium transistors in a time-division multiplex system that reduced equipment size to one-sixth that of the tube version with one-tenth the power consumption.

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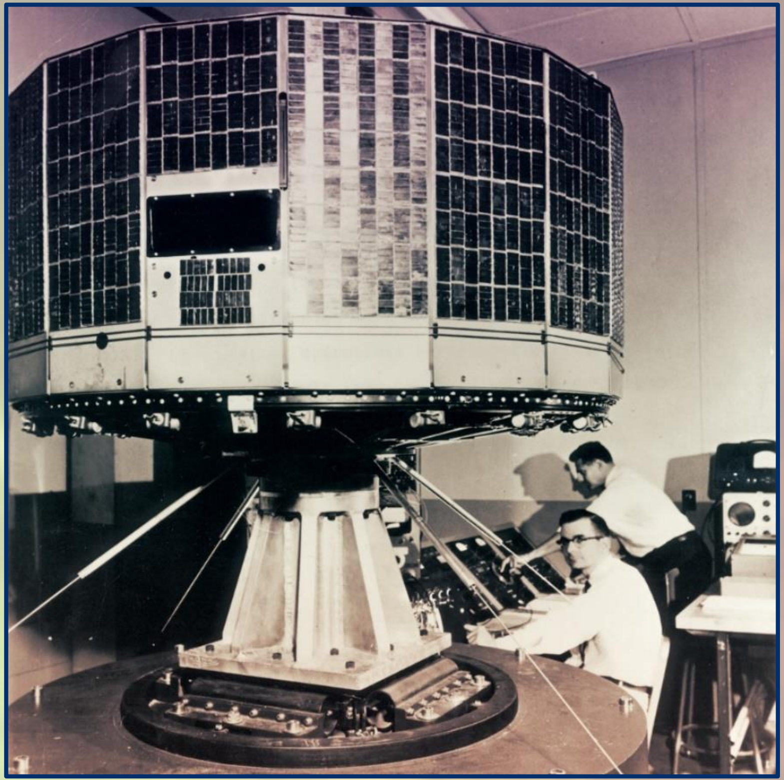
ATL HISTORY – 1960s

Our laser technology flew with astronauts aboard Gemini 7 and on helicopters in Vietnam. We developed one of the earliest successful signal-processing projects in the magnetic anomaly detector — an airborne device that detected submerged submarines for the U.S. Navy.

And our speech recognition/compression technology developed pitch-extraction and speech recognition techniques for the U.S. Air Force and speaker identification and cryptography for the U.S. Department of Defense.

Our developments in electro-optics and millimeter-wave imaging supplied the know-how necessary to reveal concealed weapons in luggage and clothing. And our work in electro-optic crystal technology foreshadowed today's large-screen TV imagery.

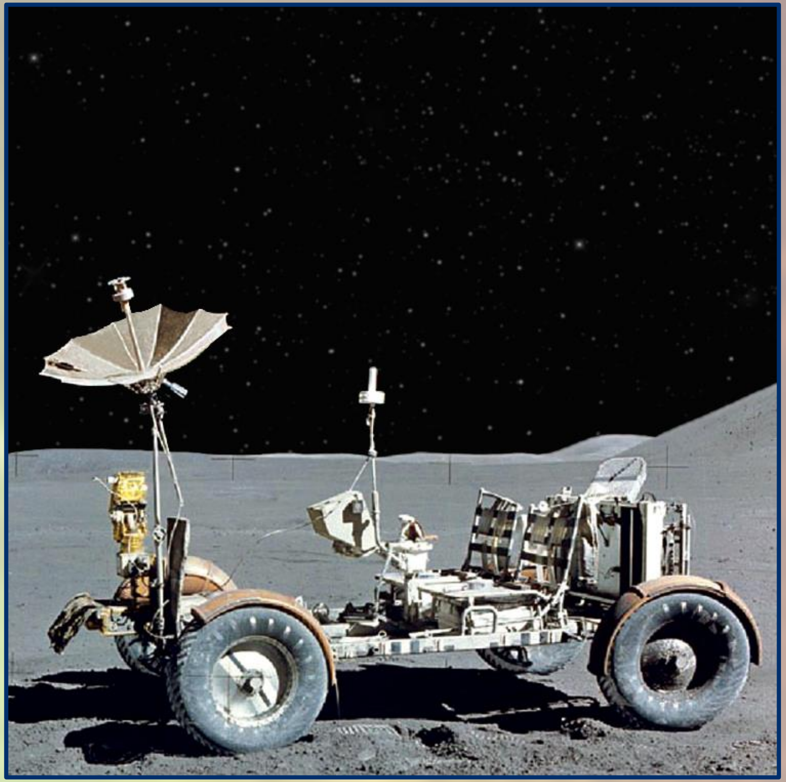


ATL HISTORY – 1970s

The world's interest in miniaturized circuitry and its eventual move away from vacuum tube technology continued in earnest. At ATL, we stayed on the forefront, developing large-scale integrated circuits with processing clocks as fast as 100 MHz (one hundred million cycles per second), logic chips that held up to 10,000 transistors — quite a feat in those days, and memory chips that held a staggering 90,000 transistors. We pioneered research in the application of charged-couple devices for imaging, memory, and signal processing.

We produced jam-proof, air-to-ground video links for real-time reconnaissance for the Department of Defense. We were one of the first to use image processing instead of video-bandwidth compression for high-performance recognition of military targets. Been to the grocery story lately and watched the clerk use a barcode scanner? Our earlier work in voice encoding led to the development of an automated laser that scanned a ten-digit coded label at 100 inches per second.

We later expanded our scanning technology for the U.S. Postal Service to scan zip codes. Meanwhile up in space, astronauts aboard Apollo 15 used our optical sight to align the module's Communications Relay antennae toward an Earth-bound broadcast target.



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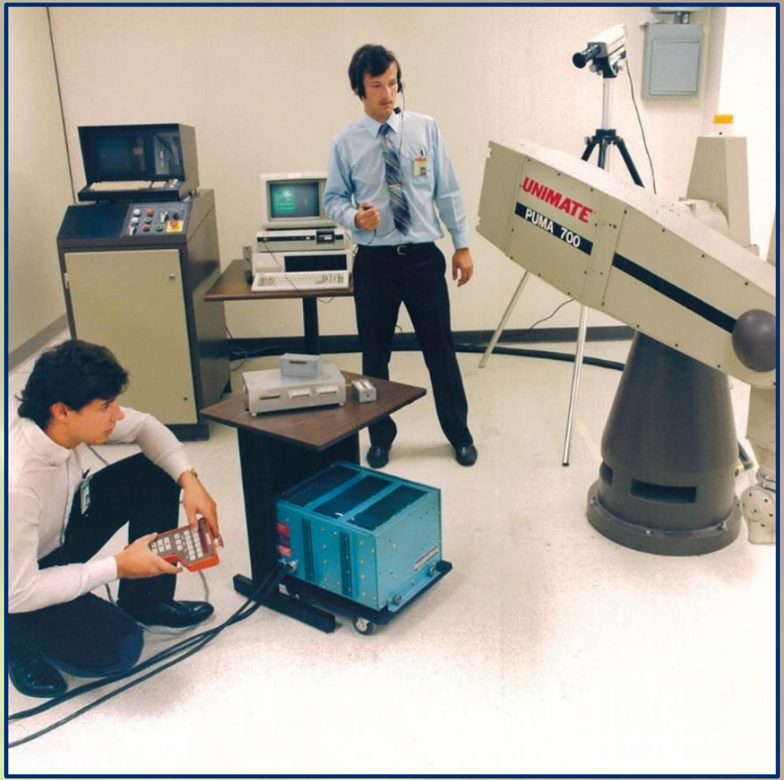
ATL HISTORY – 1980s

We turned to robotics and artificial intelligence, combining earlier work in sensors, high-speed compact processors, and distributed computing. Our contracts with the U.S. Postal Service produced machine vision for parcel sorters and a mechanical system that handled and sorted mail with unusual shapes.



Meanwhile in artificial intelligence, we concentrated on expert systems and data fusion, essentially making computers mimic the deductive processes of the human mind. We produced expert systems for the U.S. Navy that increased the effectiveness of aircraft-maintenance and that diagnosed faults in the AEGIS Combat System — the U.S. Navy's premier command and control system aboard its most modern destroyers.

Other work during this period included optical-data recording that achieved record/playback data rates greater than 10 billion bits/second. Our very-large-scale integration and very-high-speed circuits, designed using complementary metal-oxide semiconductors, enabled 200,000 transistors per unit with gate delays in the sub-nanosecond region. Our work for the Defense Advanced Research Projects Agency produced a reduced instruction set coprocessor capable of 50 million instructions/second.

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ATL HISTORY – 1990s

We developed a technology that mimics the human brain — software so sophisticated that it absorbs and coalesces in mere seconds volumes of data from numerous inputs into a near real-time assessment of a situation.

We have accomplished this through the use of data fusion and mobile intelligent agent software on programs like the Rotorcraft Pilot's Associate for the U.S. Army and the Joint Logistics Advanced Technology Demonstration for DARPA.

We developed programs that allow a person to talk to a computer while in the heat of battle, querying databases on and off the battlefield, and respond in seconds to requests. We accomplished this by combining spoken language understanding and mobile intelligent agents on the Listen, Communicate, Show — Marine program for DARPA.

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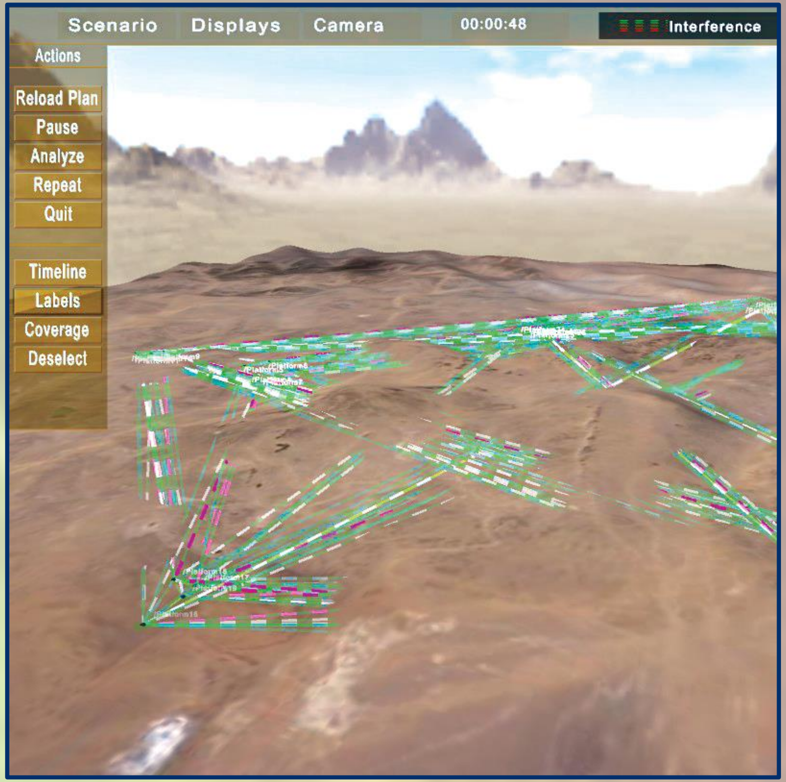
ATL HISTORY – 2000s

Imagine a team of unmanned helicopters and airplanes, working together as a team despite the fact that communications lines are unreliable. This is reality, thanks to the work we've done in automated autonomy and situation assessment.

We developed an agent-based software life-cycle to accelerate the transition of autonomous, intelligent capabilities into usable military systems. Imagine a computer system that acts like an human assistant. It doesn't just complete tasks through speech recognition — it understands normal speech patterns in specific context.

We used mobile software agents to communicate between people and applications, making information easier to find and communicate.



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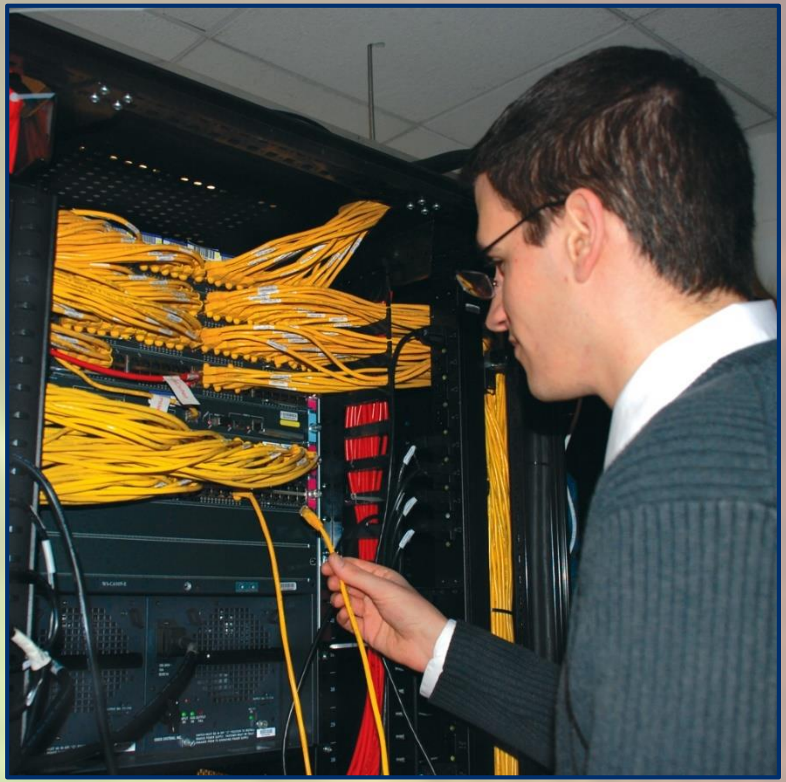
ATL HISTORY – 2010 and Beyond

Keeping our customers safe and well informed, we focus on delivering creative and innovative solutions for our customer’s most difficult problems in cyber security, informatics and advanced analytics, materials science, human systems, robotics, and spectrum management. We combine customer interests to develop a solution that makes the best use of technology given real-world constraints.

We are also focusing on machine perception and computer vision, cognitive science and neuroscience applications, nanotechnology and materials science, computational social science, and quantum computing.

We've been doing exciting work for more than 85 years and we intend to continue our legacy of technology successes well into the future.



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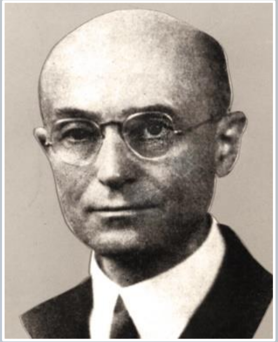
ATL DIRECTORS

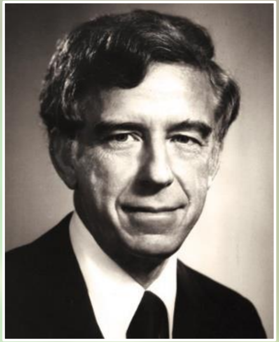


Edward Kellogg
1929 – 1948

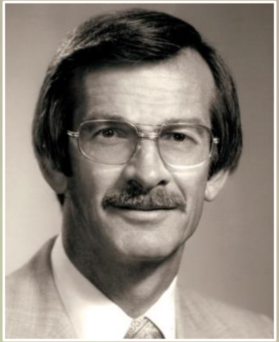
Glenn Dimmick
1948 – 1958

Harry Wall
1958 – 1963

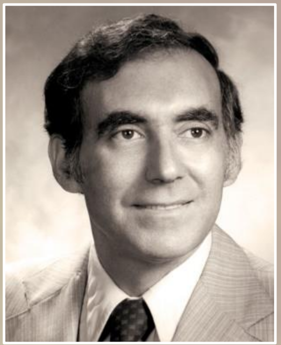
Donald Parker
1963 – 1967



James Vollmer
1967 – 1972

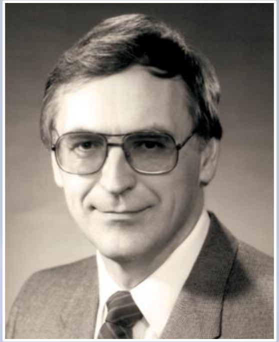


Paul Wright
1972 – 1977



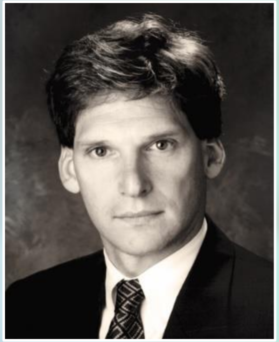
Fred Shashoua
1977 – 1982

David Decker
1982 – 1983

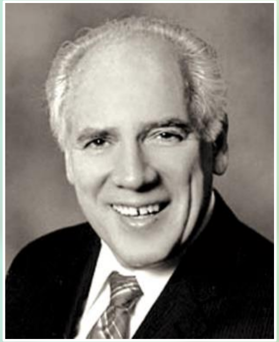


Ron Andrews
1983 – 1996

Russ Frew
1996 – 1997



Jeff Pridmore
1997 – 2004



Jim Marsh
2004 – 2009

Scott Fouse
2009 – 2014

Robert Mandelbaum
2014 – present

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