

AN/UYK-23 Field Stories

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PROLOGUE

Mr. Gunderson was searching the internet for information about the MPC-16 that he had worked with on the ARTSIIIA upgrade project. He found the VIP Club website then responded to the Legacy call for stories via editor Lowell Benson. The result is his brief career summary <https://vipclubmn.org/People3.html#DaveG>, this UYK-23 story as the May '23 'Our Stories' and the EARTS 'Our Stories' for April '23 [<https://vipclubmn.org/OurStories.html#2023>].

INTRODUCTION

The VIP Club's website, www.vipclubmn.org, references the AN/UYK-23 computer, <http://vipclubmn.org/cp16bit.html#UYK23>. The history of how the UYK-23 was built and used took but a few paragraphs. The biggest end user of the AN/UYK-23 was the United States Army in a classified role. The first system that utilized this computer was code named 'Quicklook'. The Quicklook system was an airborne data collection platform used to collect and locate hostile RADAR sites. Those RADAR sites were associated with ground missile systems. Quicklook was designed to associate the type of Soviet missile system to the types of RADAR used. The RADARs would have a personal 'signature' associated with the frequency and 'Rep Rate' of the RADAR's transmitter (Note: the term used for the RADAR was Emitter). Once the signature of the Emitter was known, the weapon system could be identified, and its capabilities were known from other sources.

The prime contractor for the Quicklook system was a company out of Dallas Texas called United Technology Laboratories (UTL). The successor system was called Quicklook II also produced by UTL. The end customer was the Army Security Agency (ASA) whose mission was to collect information in a covert way. In the Quicklook II system the type of collection was known as Signals Intelligence (SIGINT).

Another airborne ASA data collection program was called 'Guardrail'. That was a different system that collected voice communications from hostile locations. The collection was known as Communications Intelligence (COMINT). I mention it because both Quicklook and Guardrail missions were often assigned to the same military units (Note: The Units were referred to as Aerial Exploitation Battalions AEB) due to the commonality of the collection methods used.

It should be stated here that systems of this type are referred to in the Army's inventory as 'Low Density Systems' (Note: Very few were produced). This made support unique as the number of components and assemblies in the supply system were low. The first line of maintenance being the Soldiers in the field (Note: We called them 'Green Suiters'). When a faulty module in the system was detected by a diagnostic or procedure, it was swapped out by the Soldier on the Flight line and replaced by one in spares. A more technically experienced Soldier would troubleshoot the failed module in a maintenance van and isolate it to a card level. In theory this would work out perfectly.

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In the real world on a system that was complex and had limited spare parts, the outcome was less than ideal.

The general solution was to have a government civilian Tech Rep to guide the operation and become involved if things became critical. The other solution was to have a company Tech Rep on site to handle the technical stuff and get the needed parts quickly from the company. In the case of a highly classified system, getting a civilian to do field support was a critical matter.

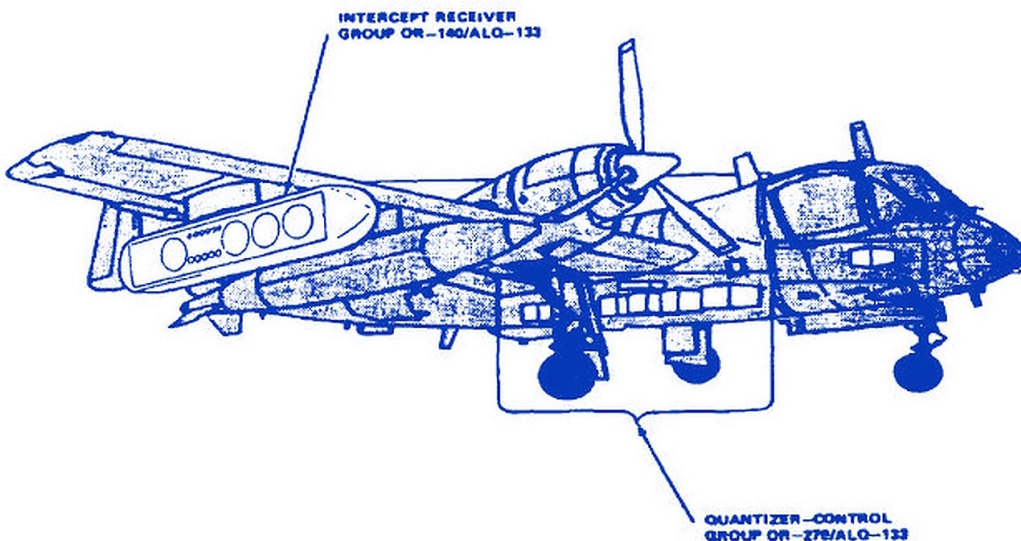
I wish that I could recite a more detailed back-story on what the long-term support strategy the Army had in mind with the Quicklook II system.

Did they want the prime contractor UTL in the trenches in the terms of logistical and technical support? Or to be traditionally supported by the Army's own Depot Level mechanism?

THE QUICKLOOK II SYSTEM EXPLAINED



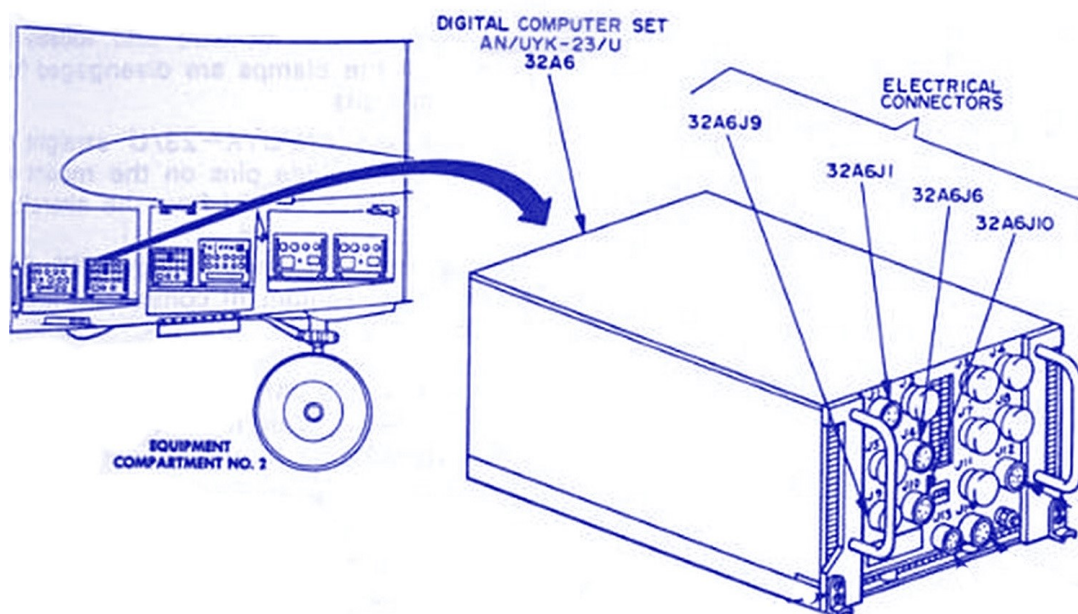
Quicklook II was hosted on the Grumman RV-1D aircraft. This airframe could be repurposed to support different collection platforms. The aircraft had a range of 1,000 miles with two under-wing gas tanks and had a top speed of 330 knots. It could carry a lot of weight and was extremely stable. It was explained to me that what made the RV-1D a great plane for the job is that it was 'slow'; slow makes for a better data collection platform.



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The primary Sensor element was referred as the 'Pod'. The Pod contained an array of four circular antennas. The phasing of the array's associated circuitry made it possible to determine the received 'Direction of Arrival' of the signal from the Emitter. The Pod acted as a receiver that was tunable over a frequency range. Once it detected a signal the Pod could determine the direction of arrival, the frequency and rep rate of the Emitter.

The other data component needed to locate the physical location of the Emitter was the positioning information from the aircraft's Inertial Navigation System (INS). {Editor's note: This was a couple decades before widespread use of Global Positioning Systems} In essence, the INS was the secondary system sensor. As you can see from the above figure, the system had two groups.



The RV-1D's belly contained two AN/UYK-23 Computers, each AN/UYK-23 having a different mission and designation. The computer designated as the 'CLP' communicated with the Pod. It would tune the frequency of the Pod and then listen for any received signal data from the Pod. The other computer was designated as the 'PCC' and would collect the navigation data from the INS. Data was later extracted from the system and post processed.

The initial fielding of Quicklook II deployed worldwide in 1979 and 1980. My involvement with the program started in the early 80's and in a most roundabout way. What brought me there? My background with UNIVAC, of course.

WHAT BROUGHT ME INTO THE STORY?

I previously had worked for UNIVAC in both the EARTS and ARTSIIIA programs doing installations and field support. When the ARTSIIIA program was winding down, my wife urged me to get out of the traveling business. It seemed an opportune time to consider my options. I had anticipated the possibility of a layoff as all of the ATC systems were now installed.

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I ended up taking a job with the Federal Government at the Sacramento Army Depot as a programmer for Automated Test Systems. My wife was happy as we bought a house, and my daughter had a more stable environment. The job was less than ideal but I was learning another skill set. One day I was approached by someone from a different office on the comment, "I hear that you once worked for UNIVAC..."

He explained that his department supported the Quicklook II system and the only component they had great difficulty was with the AN/UYK-23 computer. Nobody understood it. Repair consisted of swapping out cards and hoping for the best. Some things they just couldn't fix. "Will you talk to the project manager?" I did talk to the manager, and he said that his department would 'borrow-me' for six weeks and see if I could help them demystify the computer. I did tell him upfront that I had no prior hands-on of the AN/UYK-23 nor the shipboard sister AN/UYK-20 for that matter. I said that I would give it my best shot. They provided an office, a desk, a set of logic prints, the built-in diagnostic listing, the Army's version of the AN/UYK-23 tech manual, and some privacy. I had six weeks to learn the computer from scratch and come up with solutions, if any.

HELLO, OLD FRIEND...

Within the hour, I saw enough of the prints and the computer listing to recognize an old friend. Nice to see you MPC-1616. Let's see your functionality in this role. I went through the diagnostic listing first and stumbled across the 'Inspect and Change' routine that wasn't documented anywhere. Also missing was a Repertoire Card for the instruction set. I needed that. A call back to UNIVAC and hooking up people supported the AN/UYK-23 project corrected that. After receiving the 'Care Package' from Eagan, I was ready to building up my programming and maintenance panel skills. That was the next logical step. Progress went quicker than I anticipated. I told the manager, "I'm ready to troubleshoot."

I went through a stack of faulty and intermittent circuit cards. I wrote a memory diagnostic. I was becoming comfortable with the AN/UYK-23.

THE FIRST CHALLENGE

The worst problem that the Depot's technicians faced was the AN/UYK-23's power supply. The supply would output the voltages correctly, but the computer would 'lock-up' on a mission. Nobody could figure it out.

One of the first things I learned at UNIVAC was the 'dual section' power supply design that the computers had. One section of the supply would support the computer; the other section supported the core memory unit. The core memory's supply would come 'on-line' before the computer's supply on 'power-up' and on the 'power down' cycle the core memory should still be stable when the computer shut down. Potentiometers in the power supply set the power-up and power-down sequence to adhere to this principle. In the case of the AN/UYK-23 Computer, someone in the field fiddled around and did readjustments on the power supplies (Note: Most likely caused by a Green Suiter). Again, nothing mentioned in the Tech Manual supplied by UTL. Nobody in the field or at the Depot was aware of the dual-purpose design of the Power Supply.

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Another call was made to UNIVAC to ask the trip points for each pot and the timing window on the power down cycle. Once given the parameters, we corrected the problem.

Looking at the missing details in the Tech Manual supplied by UTL, I concluded that either they knew nothing of the AN/UYK-23 computer as it was a third-party device, or they never wanted the Government to undertake the organic support of the Quicklook II system.

YOUR ASSIGNMENT HAS BEEN EXTENDED

The six-week 'borrow-me' timeframe was extended as we were just beginning to make progress. I needed to get the bench technician up to speed on troubleshooting. I needed to document the things I had discovered. I also needed to work with the Depot's team of Tech Reps how to run the field diagnostic and interpret the results and oh yes; can you go out to the field and show the Green Suiters how to troubleshoot too?

The next several months found me traveling to every deployed Quicklook II Unit in the world. My only tasking was explaining the missing pieces and teaching troubleshooting to the Green Suiters. The trips went smooth and well received by the Units. Feedback of my trips made it back to the Depot. I was offered a full-time position as a Depot Tech Rep. As it meant a promotion and the possibility of long-term assignments on Per Diem [Note: Per Diem is a large incentive on overseas trips]. I thought that this was a great opportunity. I was back into Field Engineering.

That is the story of the AN/UYK-23 in the Quicklook II system and how it affected my post UNIVAC career. Best regards, *Dave*

Postscript by editor.

See how the UYK-23 mentioned in our story is used in another part of our legacy; a thumbnail of the application is here: <http://vipclubmn.org/sysairborne.html#Quicklook>. Our newsletter archives have 26 issues that mention the UYK-23; <https://vipclubmn.org/Newsletters/Enews2109.pdf> page 3 story *Tracking Classified Shipping*, is about a particular memory repair.

There is some 'small world' irony in Dave's story. In the early 70's, I led the environmentally testing of the AN/UYK-23 airborne version of the AN/UYK-20 computer for a then classified ASA application. This included a visit to UTL in TX with Program Manager Jack Lavers to present qualification test results for Quicklook program. I can attest to the accuracy of Dave's story. And, having been an ASA specialist [MOS 982.1663] in the late 50's, have an understanding of their 'classified' missions.

Lowell Benson - <https://vipclubmn.org/PeopleDocimg/Vol01Book1.pdf>