

You and Your V

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Editors note: This document was found in the Project Archive "Answers to questions you would never ask Bruce" by Jamie Cardick. Jamie was listed as a member of the Morrow Project technical training unit before she was frozen with Recon team I-7 frozen at <<censored>> Iowa. Jamie's team has not been recovered as of the release of this data.

Susan Roy, Assistant Administrator, New Idaho Complex

The much maligned V.

During my years of training Project teams, I discovered a common ground that North Americans share. The need to rail against the standard, and look for originality in every corner of existence. It's not a bad trait. Bruce claims that it's a trait of survivors, the ability to adapt to new and changing situations through creativity and daring. Lemmings march off a cliff because marching off the cliff is SOP. The Lemming that stops and says, "why am I marching off a cliff?" lives to breed a new race of cliff fearing Lemmings. Military organizations need conformity because no one has time to thrash about making a decision when the balloon has gone up, and for many, in tense situations different from any that they have ever faced, conformity is the only way that they can function (remember the Frat boys from college?). The project has found and trained a core of people who question, and improvise, and act independently based upon a strong moral conscience. It's the project's strength.

It's also a pain in the ass.

You see, that streak or originality often surfaces in an argument over who has the biggest <<fill in the blank>>. When project members, who have seen films on the nifty (and really hard to drive) Mars One, see their little V-150 for the first time, they sometimes look downtrodden. Every session, someone comes up to me after a question period and asks why his or her team can't instead use a different armored vehicle. This well meaning person then expounds on the value of an M1 tank, on the cross country speed of a Leopard, or the superior attributes of another armored car just shades different from a V. That's how this lecture came to be. Defending the V (as well as the Stoner, the Hi-Power, and every other standard issue piece of equipment the project has) is no longer my job. People can read this, and then happily get into their V and drive into the sunset, or they can ignore it, and still get into their V and ride off into the sunset. It matters not to me, I just work here.

How the V came to be

In 1968, the project was finishing initial plans to bury the first Recon teams. The larger issues of bolt hole construction, safety of freeze slot technology, and mission of the project had already been solved. Now it was time to start buying goodies for the project. The first team would be going into the ground in two years.

At the time, the planning teams had been working on equipment and staffing issues since 1964. In 1965, they had even frozen a test team in Montana, which almost blew the project's cover when the team, in a double blind test (they thought it was the real thing) broke out of the test area and began to help a group of farmers into enlightenment. Krell, the team's leader, noted the major hurdles that had to be overcome before teams were frozen. One of the biggest hurdles was transportation. In response, the planning committee released its specifications for the primary Morrow team vehicle.

The Project Standard Vehicle

The project planning recommendation called for a vehicle armored against small arms, with NBC defense capability, capable of cross country and amphibious movement, with a minimal support requirement, and a wide range of mission profiles. This standard vehicle would be supported by other models, but the more missions it could handle, the lower the total support costs would be (since each new vehicle adopted adds to the total support cost to maintain technical libraries and spare parts inventories). Planners saw the standard vehicle as performing a number of functions:

- 1) Convoy support- Movement of produce from agricultural areas to cities will requires convoys of vehicles protected from ambush by an armored unit.
- 2) Normal team movement- Teams would have to move through NBC hostile areas to and from assignment areas, and would need protection from the "pot-shot" style terrorism that is common in areas were rule of law has broken down..
- 3) Special Missions- Could be anything from pulling a trailer to recovering another vehicle. Being capable of special missions requires a flexible vehicle capable of being easily modified.

The V-150 was chosen as the bedrock for these main missions. The reasoning behind choosing this vehicle was more about logistics and supply than about any great flare the V-150 series had. The V-150 was currently being manufactured by Cadillac Gage for export. It was classed as a "police vehicle" for export and sales purposes, and was being widely marketed, with orders going to all continents. It's Total Cost of Operation was very low (about a quarter that of it nearest tracked competitor, the M113), and it was light enough to be carried on a normal flatbed semitrailer. In addition, the V-150 (and V-100) had been battle tested, it's advantages and disadvantages were known. A last consideration, Morrow Industries owned Cadillac Gage, so fancy footwork was easier with it than with other companies.

The final V

The V-150 that sits today in Project stores and bolt-holes is not the original V-150. Morrow Industries purchased 650 basic hulls from Cadillac Gage. A common practice with weapons sales is to sell the hard-to-manufacture core of the product to a distributor, who adds features to the basic device. The manufacturer can concentrate on producing the basic vehicle, while an arms company custom fits it for the customer (sort of like custom van sales today).

The V-150 as sold was a diesel powered armored car. It lacked air conditioning, power assist brakes or steering, or NBC filtration. Morrow Industries took the V-150 hulls in hand and fitted the engine space with quick change brackets for a large installation of the newly designed E-Batteries. To make parts purchases cheaper (and easier to hide) the drive train and axles of a M809 5 ton truck were used. This also increased the strength of the under carriage, allowing it to cross rough terrain with less chance of a cracked axle. The hull was fitted with and over-pressure air conditioner (for NBC defense), and the electrical system was entirely replaced by a full power A/C electrical system designed to use standard household current.

Since that time, the design of the V has proven very versatile. The high capacity battery packs never lived up to their design specification (even though they are still far above the state of the art). In the 1980's, all of the battery powered project vehicles were retrofitted for fusion power. The growth of electronic equipment made the A/C power grid of the Project V a very important feature. With charging points, standard household A/C outlets, and a 220 volt primary grid, the V is capable of powering even the most hungry electrical devices. Three equipment racks (standard EIA 19" rack mounts) were installed at the commander's position, the communicator position, and in the main compartment. Electrical equipment can be retrofitted easily using these rack mounts.

The Mod2

Most project teams will awake to find a Mod2 V-150 in their bunkers. Lets take a look at what the V has to offer:

Vehicle basics-

The V-150 is produced in five major variants.

- 1- Armored Personal Carrier (V-150 APC)
- 2- Fire Support Vehicle (V-150 20mm)
- 3- Armored Recovery Vehicle (V-150 ARV)
- 4- Anti-tank Vehicle (V-150 TOW)
- 5- Long Range Support Vehicle (V-150 81mm)

The TOW and Mortar carrier are used more as transport vehicles than combat vehicles, their weapons are for emergency only. Most procurement was of the APC or 20mm version, with the ARV version going to engineering teams.

The mod 2 is powered by a standard PF-17 fusion plant. Although rated at several years, tests have indicated that teams on the move will expend the fusion reaction materials in the plant in six months.

The NBC defense of the vehicle is based on an over-pressure air conditioner with air scrubbers and an integrated warning and tagging system for identification of threats (integrated with the vehicle's Advanced Computer package). Supposedly, a gas screen can be erected, and occupants may use the back entrance as an "airlock". In practice I have never seen this work very well. Exposure to chemical elements requires a complete scrubbing of the vehicle with the appropriate decon chemicals. Contamination of the inside of the vehicle is a real pain, requiring all electronics and supplies to be pulled from the vehicle and checked for contamination (and possibly discarded if they are contaminated). Then the entire vehicle takes a bath, inside an out. The moral is, if the NBC alarm goes off, stay in the vehicle until you clear the area, then wash the V down as soon as possible.

Radiation, after the initial nuclear event, is a stationary threat, with most injuries caused by ingestion of Strontium 90 and Uranium kicked up as dust near impact site. In general, the radiation units both on the vehicle carried personally should be sufficient to guard against this.

Biowar agents require a vector. Very few truly deadly germs just float through the air (Anthrax aerosol being one), and the few that do, most team members have been given broad range antibody therapy against. The major danger is a few diseases that are contact driven. Local populations during epidemic rescue missions can spread disease in several ways. Biowar agent, although deadly, do not represent as much of a risk five years after the war.

A "V" carries a vehicle standard basic load. That means a pack radio, a rifle, emergency food, a trade pack, and ammunition. This is enough stuff that most teams wont need to visit their caches for a while. Note that it is expected that the team will get food from the locals eventually. Its probably a bad idea to waste the project meal packs unless it is absolutely needed.

Data Manipulation and Communication-

The Mod2 retains the elderly but reliable project Autonav (based on the old Zilog processor), and the PRC-70 portable radio, but it also has a number of advanced features (the so called MOD2 updates). Two Advanced Project Computers (APC) are installed, one in the communicators station (assistant driver), one at the commanders station. Running the Project Advanced Computing Environment mod 90 (called PACE 90) this system handles standard data processing tasks (like word processing), but it also records real-time data from the Autonav and NBC suite installed on the V. Each

station is powered by an IBM G4 533mhz PowerPC processor, has 512mb of shielded static RAM, and stores data on a 5 drive Magneto Optical array with a capacity of 72gb, and has an 18gb DVD-RAM2 removable multi-read drive (which can read any CD form factor disk). The standard software includes a statistical modeling package, an image / sight / sound capable library module for log reports, and a very lame games package (solitaire and chess for those of you wondering). The work stations have a 17" Color LED flat displays, and various input options (including mouse, pen, voice, and key board). All computers are rack mounted and capable of being removed, but they require a 220 volt power source to operate. All computers (and the Autonav) are networked with the IPSAT through an Arbitrated Fiber Loop on board network.

The communicators station has repeater controls for the PRC-70, and a set of other communications tools. A Morrow Industries IPSAT receiver can connect into the Morrow IPSAT network when it is activated, either through its up link/down link, or through repeaters feeding via modem protocol to the teams PRC-70. An ELF teletype receiver is the most common method of getting orders and short communications to the team. All units are networked into the Morrow encryption system using the standard Pyramid Public Encoding method.

So, this fancy computer stuff is new, what does it do? Well, I like to think of it like the computer from the *Enterprise* in the television show "Star Trek". These computers gather data, collates it, tracks it, retrieves it, and shoots the data back to Prime base. Some of the data is real time and automatic, like were the vehicle has been, and what were the environmental conditions that it traveled through. Some of it is team generated, like logs of contacts with the population, medical data, observations, and even creative work. It can all be sent back to prime, either through the satnet (IPSAT) or passed to communication teams for resending.

At the same time, the team has access to the Morrow IPSAT network. With proper passwords, they can download the latest reports from all over the continent, e-mail and vid-mail teams in other parts of the world, even start a chat group on what a piece of crap the V is. Communication is a backbone of the project.

Living Out of a V

The main project vehicle is the home for a team. One time, when I was quite young, I bought a back pack and hiked part of the Appalachian Trail. Loading it around 20kg of stuff, I could carry about a weeks food and fuel. After the first week on the trail, I sent my tent home and started carrying more food. In the mountains, I could do about fifteen miles a day with a full load if I didn't take really long lunch breaks. After I was finished, I discovered the truth behind walking - its a loosing affair.

The problem is that you need a couple of pounds of stuff a day to survive. If you don't get that stuff, you wont be healthy. A team on foot, with a weeks worth of food, half their ammo issue and their sidearm, and all of the crap needed to communicate with the outside world and perform a mission, is going to be crawling at the speed of their slowest member. As Krell and Cyrano attested after their second stay in the slots, you wake up with no energy, no body fat, and poor muscle tone, no matter how beefy you were before they snaked that tube up your nose. Shouldering fifty kilos of crap is going to slow you down, almost as slow as trappers moved in the pioneer days.

Enter your V. It can carry around 2500 kg of crap, human, metal, and consumable. It's fusion pack is good for six months of travel - enough to get you from one side of the continent to the other. Every V carries all of the data manipulation, and communication crap that allows Prime base to have at least basic control over its assets. With six team members, a V and an X (XR-311), everyone has a place to sleep out of the rain. It's even reasonably bullet proof and a good temporary shelter from poisons in the environment. Teams should fall in love with their Vs.

The down side of a wanderers life is that the V isn't a Winnebago. It doesn't have a toilet, running water, a good place to stand up and stretch. Most team's Vs started to get messy after a week on the move. Ration cartons get tossed under chairs, unpacked equipment never gets pack away exactly right, and sometimes a little water will get past the bilge and give the V that musty smell. Mud gets tracked into the V from every place, and animals sometimes sneak in and hide in the most annoying places. Even the most anal clean freak will soon fall behind if the team is moving every day. Most teams will eventually be posted to stable locations. That's why most of the stuff on the V can be taken off of it. Once the

team sets up a base of operations, the V can be used as a transport, moving the team about their area of responsibility, while much of the data collection stuff stays in a local building powered by an engineer set-up fusion plant.

Swimming a V

If care is taken, the V makes a really bad boat. It's not exactly a yacht, but it can cross calm bodies of water. Unprepared, it can only move about two or three kilometers per hour through the water. Any faster, and the bow wake will swamp the V and poor inside. The bilge can keep he inside nice and dry, unless water comes in through the top hatches. Then, its only a matter of time before the V sinks.

Putting up the swim vane helps the V move at its fastest, a breath taking 5 kmh. It also leads to the argument, should we swim with the hatches open, or closed. Open, and a wave can swamp the V, sinking it, but an open hatch may allow the crew to swim to safety. Closed, and the V is much more water tight, but their is always that fear that the V will sink anyway, and no one will have a chance to escape.

Repairing the V

The V was made to repair. The axles on the V are the same used by the M809 track, one of the most common transport in Army inventory. The power system uses shielded 110 and 220 volt parts, available in almost any city (unlike the high amperage 24 volt stuff in most AFVs). In an emergency, unshielded breakers, cables, and connectors could be used. The brakes and power steering are unique, but can be replaced by the hydraulic brakes from a large truck and a power take off. Hinges, vision blocks, door assemblies, and seats are all used by US Army vehicles, primarily the M113, and should be available. The tires are standard run flat ATV truck tires, but several types of tires could be used. The fusion power plant can be replaced in an hour with the help of an AEV or a shop facility. Replacing it is simple because only four connectors need be switched. In an emergency, a rack of E-Bats could be substituted for the power plant. They would provide up to a weeks worth of power (assuming that the engine space was crammed full of batteries) but would require an AC to DC converter box to power the V. Since the V has 110 volt power service, any shop based power tools can be used without setting up power for the building. Simply run a power cable into the V's equipment rack or plug into the external power out.

Other neat things to do with your V

Tow a trailer- There are tow hitches on back, you can tow up to a metric ton if the V is fully loaded.

Paint it- When you get your V, it is OD green. I usually paint mine to match the season. Unless you think combat is close, paint standard Morrow air recognition symbols on the top of you V, and paint a light blue (UN blue) diamond on the side of the V. Light blue is a recognized color for peace keepers and may make contact with people easier. By the way, it is against Project policy to personalize you vehicle paint job. Between you and me, it's a crap rule that Turner invented to prove he was more uptight than the next guy. I always paint a heart on the front of my V, and Lorne at J-City training center paints his V with a "thumbs up". Of course, I also keep some paint to black out my artwork should I need to take it into violent action (or Turner shows up with some Council tight ass).

Provide power for something- In spare moments, I have hooked a V up to a washing machine, a microwave, a lighting grid (for a rock group), and have wrapped my V in Christmas lights. All fun aside, the V really can power a base camp, a hospital, or a research center, at least until the engineer types get something better worked out.

Use the winch - Everyone forgets about the winch. With it, a V can move across rough terrain (slowly) and tackle all but vertical ascents. The winch can pull down road blocks, get stuck cars out of the mud or snow, and even be used with a counter pulley to get big things into the air.

Gung Ho!- Lots of crews have modified training Vs during their stay at Pajaro (and we have to modify them right back afterward). The weld on gun shields, more pintels, mounts for smoke grenades, and even build sand bag bunkers retained by metal frames on top. We let them if they want, its good practice and doesn't hurt the V (although the sand bag job made the V unsteady when swimming. One really mechanically oriented women installed hedge-hoppers, grenade screens, an under armor remote control for the M2HB, and a full stereo system in her group's V. She used her personal equipment space [1](#) to take the stereo with her.

Problems with the V

>> After swimming, be very careful about the brakes. The hydraulic system gets water in it easy, and breaking distance is doubled.

>> The bilge never gets all of the water out of the engine. When the V is battle damaged, its normally shielded and grounded power can short. This seems to be caused by transient vibration from an impact (read, a big gun hits the V and rocks it around). When no water is present, this short will show up as a power fault, but wont really effect operation (as long as the long power lines that feed the front of the vehicle, the turret, or the equipment grid are not shot away). If water is in the engine compartment, then a person can create an open circuit between a power feed and the engine hull, with them in between. If the 110 lead of the three phase is the culprit, then you will get a shock that will stand you hair up on ends. The 220 volt tripod point will cause burns, and let you know if you are a risk for heart failure. If you are at risk, you will have one. If you are lucky enough to cross a couple of 220s, then you can potentially blow the motors that run the V. Also, you will be dead in a very unpleasant way. Unlike the DC power that feeds most vehicles, the AC power of the projects vehicles cause your muscles to flex when you are zapped, often throwing you clear. High amp DC power systems cause your muscles to clench, and you are stuck holding the wire until post rigor sets in (6-24 hours after your death), or someone pries you fingers off the line. No project vehicle uses high amp DC, but be very careful with the ganged batteries on many military systems.

If water gets in the engine, power the plant to idle, open the engine compartment, and towel it dry. Let it sit with the compartment open for a while. I usually spray "Fresh Air" engine compartment scent in afterwards, but you likely don't have any of that, so don't worry about it. Don't leave the compartment open over night, because the engine radiates heat and is just warm enough, without being hot, to attract creepy crawlies. Several months ago, I powered up a V and was met with a scream from the engine compartment. Turned out to be an Opossum that wasn't expecting her dry and warm cave to start moving.

>>The original V-150/V-100 was prone to broken axles. The project V is does not have that problem, but axles can break. Jumping the V, allowing into to go head first into a ditch at high speed, and driving the V off a vertical embankment all leads to broken axles in any vehicle. Unless you get a spare axle and strap it on the V, your out of luck. Wait for an ARV to get to you (which may take a week). If you do, by chance, have a spare axle, the V is capable of self recovery. Build a heavy wooden frame over the V. get some big chunks of wood. Winch the V up, and get the wood under the tow points. Now use the winch and a pulley to lower the axle off the V. Get the spare and reattach it. All of this takes around three days to do safely, and some construction skills. When in doubt, don't do it. Getting crushed by your V is not a fun way to go.

1 All project personnel assigned to mobile teams get to take a shoe box full of anything with them. Most use it for personal mementos or luxuries. The project limits what a team member can carry not because of space in the bolt-hole, but space in the vehicle.