

WIDS™

VEHICLE DESIGN SYSTEM

VDS 1.0™

©1996, 1997 by Greg Porter

Published by: Blacksburg Tactical Research Center
P.O. Box 1121
Collinsville, VA 24078

email: btrc@btrc.net
web: <http://www.btrc.net/index.html>

Design: Greg Porter
Artwork: Courtesy of NASA, United States Department of Defense and other government and military archives
Graphics: Greg Porter

Playtesters: Bret Jones, Jasper Merendino, Phillip McGregor, David Pulver and special thanks as a whole to the GDW-beta mailing list

Dedicated to: Cathy

Hypertext 1.02 edition, March 1998

Published on-line in the United States of America
All rights reserved
Protected by the International Copyright Convention

This work may not be duplicated in part or in whole by any means, including text, electronic, facsimile or other means except for the personal archival use of the legitimate purchaser. Not that we've made any serious attempt to prevent you from doing this, but we're trying to make a living here...



Intro to the .pdf edition

The **CORPS VDS** is one of the more ambitious hypertext projects **BTRC** has produced. **Slag!** was probably harder, as the entire book had to be reformatted for on-screen viewing, while **VDS** is meant for either large-screen monitors or printing on inkjet or laser printer. But **VDS** required a *lot* more number crunching and research, which we hope was not in vain.

As usual for **BTRC** hypertext documents, text in **red** is usually a hyperlink to someplace. Due to some printing problems, we've left out the blue destination links. Colored text boxes serve the same function as in **CORPS**, **green i boxes** for general info, **blue Δ boxes** for alerts and **red ✂ boxes** for things you just shouldn't be doing. Items in reversed text are just for visual contrast and have no special function other than a major subject heading.

Printing this

This should print well on normal 8.5" x 11" paper, and on the European A4 size as well. For best color printing we suggest a resolution of 360dpi or better, and the use of diffusion dither rather than regular halftones. The color mix is designed to be either a pure CMYK color or a 50-50 mix of two of them. Red is 50% magenta and 50% yellow, for instance. On laser printers, a modern 600dpi printer should do an excellent job. If you can adjust the level of halftone screening, it should be at least 85 lines per inch. Laser printers of 300dpi resolution provide adequate output for all but a few pages, notably the contents, which has both an illustration and small type competing for the same laser dots.

Other hyperlinks

If you noticed the art credits, you would see that every picture in here was taken from some public domain or copyright-free source, like various branches of the US government. Our taxes paid for them, so we might as well use them. For more neat vehicle illustrations and general interest vehicle web pages, try the following:

DefenseLINK

<http://www.defenselink.mil/photos/index.html>

Lots of Defense Department photographs, many dealing with military exercises, so there are lots of pictures of vehicles in normal operation.

Center for Military History

<http://www.army.mil/cmh-pg/nmusa3.htm>

Of general interest to military history buffs, and includes links to various US Army museum web pages.

OHA's Page of Defense Related Information

<http://www.ifi.uio.no/~oddharry/dsfmc/mill.html>

More links than you can shake a stick at, including manufacturers, government links, journals, theory, sensors, computers and a host of other topics appropriate to vehicle or weapon design and use.

Army Vision 2010

<http://160.147.68.21/2010/>

From the introduction: "Army Vision 2010 is the blueprint for the Army's contributions to the operational concepts identified in Joint Vision 2010. It is the conceptual template for how the United States Army will channel the vitality and innovation of its soldiers and civilians and leverage technological opportunities to achieve new levels of effectiveness as the land component member of the joint warfighting team." BTRC translation: "The new ways and means with which we will kick people's asses." No pictures, but gives an idea of doctrine and tactics for high-tech warfare.

NASA Image eXchange

<http://nix.nasa.gov/>

NIX is a searchable index of NASA photos, including spacecraft, satellites and experimental aircraft.

The Canadian Air Force Photo Archive

<http://www.achq.dnd.ca/archive/>

An indexed selection of photos from the Canadian Air Force, going back as far as WWI aircraft.

Air Force Link Photos

<http://www.af.mil/photos/>

A selection of fairly recent publicity or news photos of aircraft and Air Force exercises. Also has links to other Air Force-related art web pages.

MarineLINK Image Library

<http://www.usmc.mil/images.nsf>

This page has a large selection of Marine Corps and Marine-related illustrations and photos. It has a large selection of subject matter and a searchable index. Definitely worth checking out as it continues to expand.

The Military Network

<http://www.military-network.com/default3.html>

An extensive collection of military resources, including links for foreign government and military web pages. Good starting point for any search of current weaponry or vehicles.

Sci-Fi Hollywood

<http://www.scifihollywood.com/>

An on-line gallery of science fiction props, including weapons, spaceships and items for sale. A source for pictures of vehicles that we haven't invented yet.

America OnLine

While I don't think the material is available over the Web, AOL has a large collection of images in the 3D Special Interest Group area (keyword: 3DSIG), including a number of excellent spaceship designs and scenes. Note that these images are copyrighted by the creators and while you can view or print them for your own personal use, putting them in any form of published or commercial work without the creator's permission is not a good idea.



CONTENTS

- Intro** 2
 - Terminology 3
 - Overall guidelines 3
 - Tech Levels 4
- Performance** 6
 - Top speed 6
 - Acceleration 7
 - Climb rate 8
 - Gravity as power 9
 - Deceleration 9
 - Turn Mode 10
 - Suspension modifiers 10
 - Secondary Turn Mode 11
 - Turning in place 11
 - Ground pressure 11
 - Am I Doing This Right? 12
- Power Plant** 13
 - Design 13
 - Durability 13
 - Fuel economy 14
 - Multiple fuel engines 14
 - Batteries 15
 - Storage banks 16
 - Special cases 16
 - Armor Value 16
 - Crew requirement 17
 - Boosting 17
 - Tweaking 17
 - Animal power 18
 - Electric motors 18
 - Generators 18
 - Pony engines 19
 - Reaction engines 19
 - Multiconfiguration engines 21
 - Solar power 21
 - Wind power 22
 - Windmills 22
 - Cooling 23
 - Maintenance fuel 25
 - Startup time 25
 - Magic power 26
 - Am I Doing This Right? 28
- Power Train** 29
 - Wheels 29
 - Tracks 29
 - Legs 29
 - Indirect to thin medium 29
 - Indirect to average medium 29
 - Indirect to dense medium 29
 - Armor Value 30
 - Turning in place 30
 - Reverse speed 30
 - Secondary power trains 31
 - Special cases 31
 - Antigrav 31
 - Artificial gravity 32
 - Articulated vehicles 32
 - Earthborers 33
 - Hoverskirts 33
 - Helicopters & VTOL 34
 - Jump drive 34
 - Towing 34
 - Am I Doing This Right? 35

- Structure** 36
 - Configurations 36
 - Internal structure 38
 - Typical vehicle volumes 39
 - Lighter than air vehicles 40
 - Seating and accommodations 41
 - Special purpose areas 44
 - Overall opulence 45
 - Special quarters 45
 - Crew notes 45
 - Am I Doing This Right? 47
- Surface Treatments** 48
 - Armor 48
 - Hardened armor 50
 - Radiation abatement 50
 - Special purpose armor 50
 - Battering rams 52
 - Turrets 52
 - Streamlining 53
 - Wings 55
 - Stall speed 56
 - Speed regimes 56
 - Variable pitch wings 56
 - Folding wings 56
 - Wing profiles 57
 - Hydrofoils 57
 - Helicopter rotors 58
 - Spoilers 59
 - Stealth technology 59
 - Boat hulls 60
 - Submarines 61
 - Environmental sealing 61
 - Am I Doing This Right? 62
- Accessories** 63
 - Access and Structure 63
 - Airlocks 63
 - Bulkheads 63
 - Cargo 64
 - Catapults 64
 - Docking ports 65
 - Drop tanks 65
 - Firing ports 65
 - Hangars 65
 - Hardpoints 66
 - Ladders 66
 - Torpedo tubes 66
 - Towing hitch 66
 - Armor and protection 67
 - Force fields 67
 - Retractable armor 68
 - Wheel/track skirts 68
 - Power plant 69
 - Refinery 69
 - Refueling probes 69
 - Snorkel 69
 - Redundant systems 69
 - Controls 70
 - Cybernetic controls 70
 - Extra controls 70
 - Remote controls 70
 - Specialized running gear 71
 - Stabilizers 71
 - Environment 71
 - Basic climate control 71
 - Life support 72
 - Food & water 73
 - Maintenance 73
 - Spare parts 73
 - Miscellaneous 74
 - Computers 74
 - Manipulators 74
 - Retractable items 75
 - Safety 75
 - Component armor 75
 - Disaster system 76
 - Escape devices 77
 - Emergency lighting 77
 - Medical kits 78
 - Parachutes 78
 - Secure storage 78
 - Security systems 78
 - Vestigial fire extinguishers 78
 - Weird-ass stuff 79

- Sensors** 79
 - Sensor operation 79
 - Active sensors 80
 - Passive sensors 81
 - What you get 81
 - Encryption 83
 - Minimum size 84
 - Redundancy 84
 - Protection 84
 - Headlights 84
 - Sensor use 84
 - Typical sensor types 85
 - Electronic countermeasures 86
 - Electronics 87
 - Starship notes 87
 - Am I Doing This Right? 88
- Weapons** 89
 - Weapon lists 89
- Combat** 92
 - Range 92
 - Range Mod 92
 - Size 92
 - Visibility 92
 - Bombing 93
 - Proximity fuzes 93
 - Spotters 93
 - Strafing 94
 - Blowing things up 94
 - Advanced hit locations 95
 - Details and special cases 97
 - Fires 99
 - Explosions 99
 - General targeting notes 100
 - Vehicle stability 100
 - Am I Doing This Right? 101
- Campaigning** 102
 - Vehicle as setting 102
 - Vehicle as antagonist 103
 - Vehicle as object of adventure 103
 - Vehicle as transport 104
 - Vehicles and role-playing 104
 - Clambering around 104
 - Stunts 105
 - Jumps 105
 - Commercial travel 105
 - Legal considerations 105
 - Space travel times 106
 - Temperature regimes 107
 - Vehicle Manufacture 107
 - Design 107
 - Bugs 109
 - Standardization 112
 - Warranties 112
 - Markup 112
 - Retrofitting 113
 - Breakdowns 113
 - Other vehicle maintenance 114
 - Real-world notes 115
 - Reciprocating external combustion 115
 - Turbine external combustion 115
 - Electric motor 115
 - Fission reactor 115
 - Fusion reactor 116
 - Antimatter reactor 116
 - Reciprocating internal combustion 116
 - Turbine internal combustion 116
 - Solar power 116
 - Solid fuel rocket 117
 - Liquid fuel rocket 117
 - Typical fuels 117
 - Specialized fuel handling 118
 - Vehicle layout 118
 - Am I Doing This Right? 119
- Sample Vehicles** 120
 - TL3: Trirreme 120
 - TL5: DiVinci War Wagon 121
 - TL7: Armored Frigate (Gloire) 122
 - TL9: Jet Fighter (ME-262) 123
 - TL11: Tank (M1A3) 124
 - TL13: Interstellar Freighter 125
 - TL15: Hypersonic interceptor 126
 - TL17: Assassin Android 127
- Reference Sheets** 128-159



INTRO- DUCTION

Basics

The **CORPS Vehicle Design System** (or **VDS**) is not based on strictly historical concepts, since it is for **CORPS**, a universal system. Using the **VDS**, you can create vehicles for *any* Tech Level or background, and know that they will be consistent within that background and within any other background using that system. Like **3G³**, this system lets you design things that never were, and are unlikely to have ever been. This is *your* problem, not ours. If you decide that Leonardo DiVinci got a fat government grant and started cranking out steam-powered tanks, we disavow all responsibility for damage to your continuum or sanity.

To keep vehicles portable within genres and systems, many components are “generic”. For instance, you may find terms like “exotic power plant”, which is not defined as any particular type. In a modern game, it might be a jet turbine. In a fantasy game it might be a captive elemental, and in a science fiction game it might be antimatter. What matters is the game effects, and you can call it whatever is reasonable for the world the vehicle is created for. Likewise, many other vehicle aspects are given effects, and the implementation is left to the designer. It doesn't matter in the design process if you want sliding doors or gull-wing doors, four large wheels or six smaller ones, or whether you have leaf springs, struts or unequal length A-arms. What matters is how it works in *your* game world when someone stomps on the accelerator.

You *can* design hideously large and complex vehicles with **VDS**, up to and including battleships, but it really isn't designed for that. **VDS** is meant as a *role-playing* aid, *not* the front end of a vehicle combat system. If characters start to get more worried about getting lost inside than in using the vehicle, then you've probably gone too far.

i A mundane vehicle is usually very fast to design. It has a power plant, power train, fuel, structure, some degree of streamlining and incidental armor, basic passenger seating and a fuel tank. All other characteristics of the vehicle such as acceleration, handling, cargo capacity, range and such all are functions of these items.

Vehicle components

Almost all vehicles will be based on the following components, each of which has a separate section of rules:

Performance

The details of what you get out of what you put into the vehicle. Oddly enough, vehicle performance is first on your design list. Once you know what it will take to get the top speed, acceleration and other vehicle characteristics, the better you will be prepared to make the decisions on power plant, structure, streamlining and other actual vehicle components. You will probably have to reference this section numerous times during vehicle design as you change its other features. Some of the things you will read here will be duplicated elsewhere for ease of reference. **See pages 6-12.**

Power plant

That which provides energy to make the vehicle go, and/or power other items such as the stereo, headlights or particle cannon. **See pages 13-28.**

Power train

The power train takes the output of the power plant and converts it into the actual method of propulsion, such as wheels, tracks, propeller, etc. **See pages 29-35.**

Structure

The frame of the vehicle, which handles the stresses placed on it by the power plant. It also includes the power train and the interior furnishings for any vehicle that carries passengers. This can be as basic as bench seats, or as complex as scientific laboratories. **See pages 36-47.**

Surface treatment

Some special item added to the basic structure of a vehicle for a particular purpose, like streamlining, armor, wings, waterproofing, etc. A vehicle may often have several surface treatments that work towards a common theme. For instance, a sub needs waterproofing, a pressure hull and streamlining, all of which are surface treatments. **See pages 48-62.**

Accessories

Anything else that is left, like electronic equipment, sensors, spare parts, fuel tanks and so on. **See pages 63-88.**

Weapons

Examples of weapon and sensor systems for various Tech Levels. To design new weapon systems, you should use BTRC's **3G³** weapon design system. **See pages 89-91.**

Combat

What to do with those weapons, including rules to cover situations not in the basic **CORPS** rules. **See pages 92-101.**

Campaigning

And last, how to use vehicles in your game world, and the trials and tribulations they will encounter. **See pages 102-119.**