

# VSP Design Files & XDDM for Cart3D Optimization (Coming Soon)

Rob McDonald – Cal Poly

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# VSP Input Representations

- Input
  - Parametric geometry (vsp)
  - Background image (jpg)
  - Surface textures (tga, jpg)
  - Automation script (txt)
  - Airfoil definition (af)
  - Fuselage section definition (fxs)
  - Cabin definition (cab)
  - Wireframe as mesh (hrm)
  - Wireframe as surfaces (hrm)
  - Triangulated mesh (stl, NASCART)
  - Vorlax case file (cas)
- Coming soon
  - Design file (des, xdes, XDDM)

<http://www.openvsp.org/wiki/doku.php?id=representations>



# VSP Output Representations

- Output

- Parametric geometry (vsp)
- Screen capture (jpg)
- Automation script (txt)
- Wetted area/volume report (txt, csv)
- Drag buildup report (tsv)
- Area ruling report (txt)
- Mass properties report (txt)
- Wireframe (hrm)
- X3D 3D Web model (x3d)
- Felisa (fel)
- Untrimmed surfaces (3dm)
- Trimmed surfaces (srf)
- Unintersected triangulated components (tri, possibly others)
- Intersected triangulated components (stl, NASCART, tri, msh, pov)
- Isotropic triangulated surface mesh (stl, poly, tri, obj, msh, NASCART)
- Structural mesh (stl, NASTRAN, Calculix)
- Vorlax case file (cas)
- Vorlax geometry & input (inp)

Coming soon

- Design file (des, xdes, XDDM)

<http://www.openvsp.org/wiki/doku.php?id=representations>



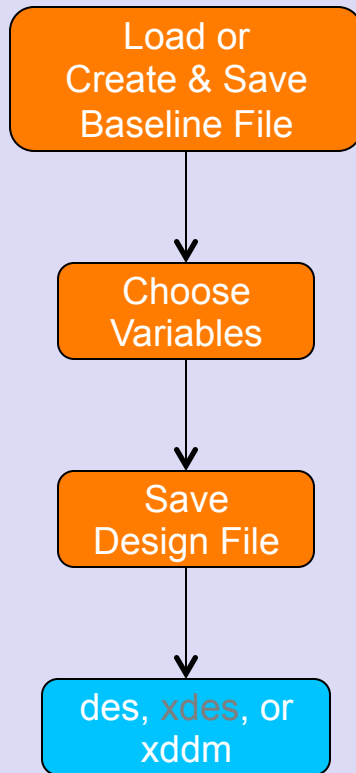
# XDDM & Cart3D

- Cart3D (Marian Nemec) defined file to describe design problems.
  - Extensible Design Description Markup
  - XML File
  - Basic Elements
    - Variable, Constant, Analysis, Function, Sum, Objective, Constraint, Configure
  - Framework Elements
    - Geometry Modeling, Flow Analysis, Module Synthesis
- VSP will have minimal support
  - Just 'Variable' elements
  - Will ignore everything else on 'Load'
    - Exactly what you want VSP to do.
  - Writes a 'fresh file' on 'Save'
    - Will not write out other elements.

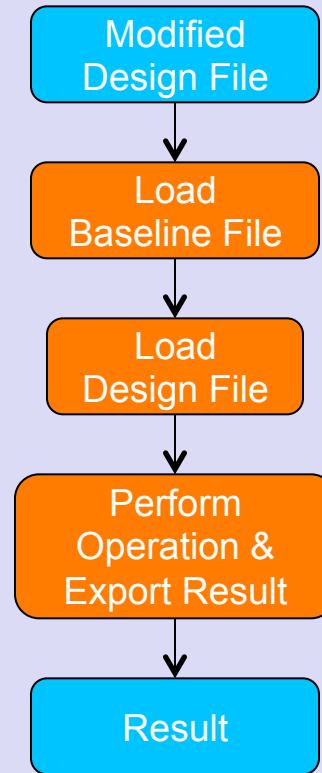


# 'Design' Workflow

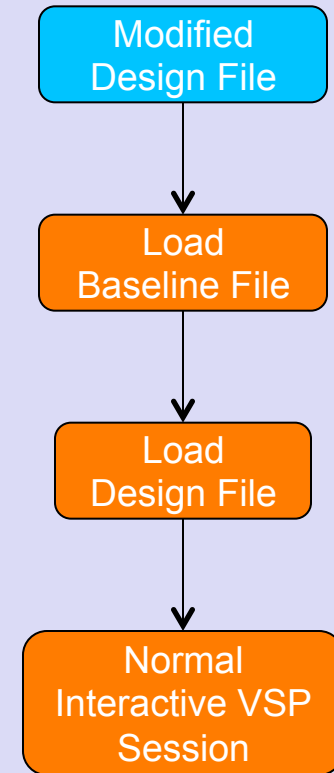
## Setup (Interactive)



## Design (Batch)



## Inspect (Interactive)



# Accessing Design Variable Manager

OpenVSP 2.1.0 - 07/02/12

File Window **1** **Geom** Script Vorview Revert Help

- Modify...
- CompGeom (Union)...
- CFD Mesh...
- Awave Slice...
- Mass Prop...
- Aero Ref...
- Wing Structure...
- Link...
- 2** Design Variables...

**Design Var Mgr**

**Design Variables**

Variable	
Comp	0-UserGeom
Group	User
Parm	UserParm1

Add Variable Delete Variable

**Variable List**

COMP_A	GROUP	PARM

Wire Hidden Shade Texture

Aircraft Type:

**Design File**

Type Design file \*.des

Save Load



# Design Variable Manager

The image shows a screenshot of the 'Design Var Mgr' dialog box. It is divided into several sections: 'Design Variables' (with dropdowns for Comp, Group, and Parm), 'Add Variable' and 'Delete Variable' buttons, 'Variable List' (a table with columns COMP\_A, GROUP, and PARM), 'Design File' (with a 'Type' dropdown), and 'Save' and 'Load' buttons. Arrows from text labels on the left point to these sections.

Variable Chooser

Add/Delete Variable

Variable List

File Type Chooser  
(des, xdes, xddm)

Save/Load Design File

Design Variables		
Variable		
Comp	0-UserGeom	
Group	User	
Parm	UserParm1	

Variable List		
COMP_A	GROUP	PARM

Design File	
Type	Design file *.des



# \*.des Design File

Number of Variables

```
4
42539520:Wing:Sect_0:Sweep: 35
42539520:Wing:Sect_1:Sweep: 35
42539520:Wing:Sect_1:Twist: 0
42504192:HTail:Sect_0:Area: 11.7679
```

Unique  
Component ID

Component  
Name

Group

Parameter

Value





# \*.xddm Design File

```
<?xml version="1.0"?>
<Model ID="/Users/ramcdona/Documents/OpenVSP/build/VSPeclipse/WingBod.vsp" Modeler="OpenVSP" Wrapper="wrap_vsp.csh">
  <Variable ID="42539520:Wing:Sect_0:Sweep" Value="35.0" Min="-85.0" Max="85.0" VSPVarName="42539520:Wing:Sect_0:Sweep"/>
  <Variable ID="42539520:Wing:Sect_1:Sweep" Value="35.0" Min="-85.0" Max="85.0" VSPVarName="42539520:Wing:Sect_1:Sweep"/>
  <Variable ID="42539520:Wing:Sect_1:Twist" Value="0.0" Min="-45.0" Max="45.0" VSPVarName="42539520:Wing:Sect_1:Twist"/>
  <Variable ID="42504192:HTail:Sect_0:Area" Value="11.767910" Min="0.0001" Max="1000000.0" VSPVarName="42504192:HTail:Sect_0:Area"/>
</Model>
```

XDDM ID  
(Change as  
needed)

VSPVarName  
(Do not change)



# Command Line

des:

```
vsp -batch airplane.vsp -des airplane.des ###
```

xdes:

```
vsp -batch airplane.vsp -xdes airplane.xdes ###
```

xddm (Cart3D Optimization):

```
vsp -batch airplane.vsp -xddm airplane.xddm ###
```

Where **###** stands for any 'normal' batch mode command.



# Demo Session

- Setup
  - Open baseline model
  - Choose variables
  - Save design files (des, xddm)
- Simulated Design
  - Change files
- Inspect
  - Load design files with changes

