

Space System Analysis Using CAD Geometries

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Topics

- **CADLOOK STEP Interface**
- **Fastrad GDML Interface**
- **SPENVIS Interface**
- **Geometry Complexity**
- **Multi-Core Timing Tests**
- **Multi-Core Utilization**

CADLOOK Interface

- Never Hiccups on a STEP File
- Handles Mixed Length Units
- Outputs Standard STEP File
- Outputs VRML Tree File
- STEP Comments to VRML
- VRML to GEOM/TREE Parser

Fastrad GDML Interface

- **Wednesday: Fastrad Download**
- **Wed/Thurs: STEP to GDML Tests**
- **Thursday: GDML to GEOM/TREE**
- **Combox Example, 1+ MB STEP**
- **IBEX Example, 50 MB STEP**
- **MMS Example, 80 MB STEP**

CAD Geometry Complexity

Name	Objects (1000s)	Regions (1000s)	Surfaces (1000s)	Polys (10 ⁶)	STEP_files (# / MB)	VRML_Data (GB)
SDO	1.4	5.9	99	1.1	1 / 219	(ST_Viewer)
	1.8	6.6	99	4.1	1 / 219	1.1
MMS	1.3	5.9	44	1.8	1 / 100	.5
COM1	17.6	32.1	188	7.8	8 / 405	2.0
COM2	19.4	39.6	216	9.3	8 / 575	2.2
COM3	23.5	66.5	193	7.8	4 / 490	1.9

Multi-Core Test Timing

Name	GHz	Cores	Time,minutes @ 1 job/core	16_Jobs minutes
Dell_xps	3.4	1+	23.55/40	320
Dell_Xeon	2.8	2+	31.45/49.02	196
Acer_Duo	1.66	2	24.49	196
MacBook	2.2	2	19.84	159
Alienware	2.33	2	17.54	140
Sager	2.4	4	16.97	68
BigMac	2.8	8	13.09	23.38
2 core virtual machines:			13.28-15.52	

Multi-Core Utilization

- Grid
- Internal Multi-thread
- Parameterized Point Sets
- TBD

Concluding Remarks

- CAD/STEP/TESSERATION is Mainstream (novice AND GEANT4)
- Heavy Ion Modeling Now Sufficient (MCNPX and GEANT4)
- Need to Generate Fragmentation Matrices for ZpAp on ZtAt → ZxAx
- Multi-Core Strategies for Adjoint MC
- 32/64 bit, OS independence, ...