

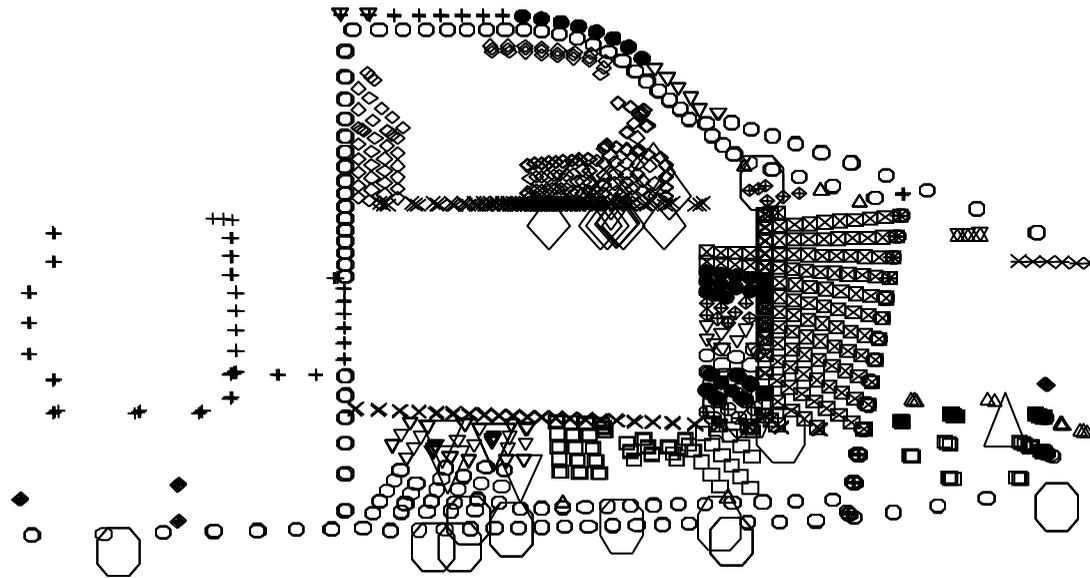
Shielding Analysis and Models

**Will Maxson
Space Radiation Analysis Group
NASA - JSC**

CURRENT MODELS

- Space Shuttle Model
 - Written ca. 1981
 - Modified for new airlock configuration 1996
 - Geometric model uses Al equivalent material
 - Fairly high resolution, especially in crew compartment
 - Model updates are not intuitive and are inefficient
 - Model is data file which is analyzed by simple FORTRAN code (EVDP ca. 1971)
 - Many Shuttle flights - excellent verification of model with actual dose numbers

× New shuttle crew compartment @ 505,0,400 ×

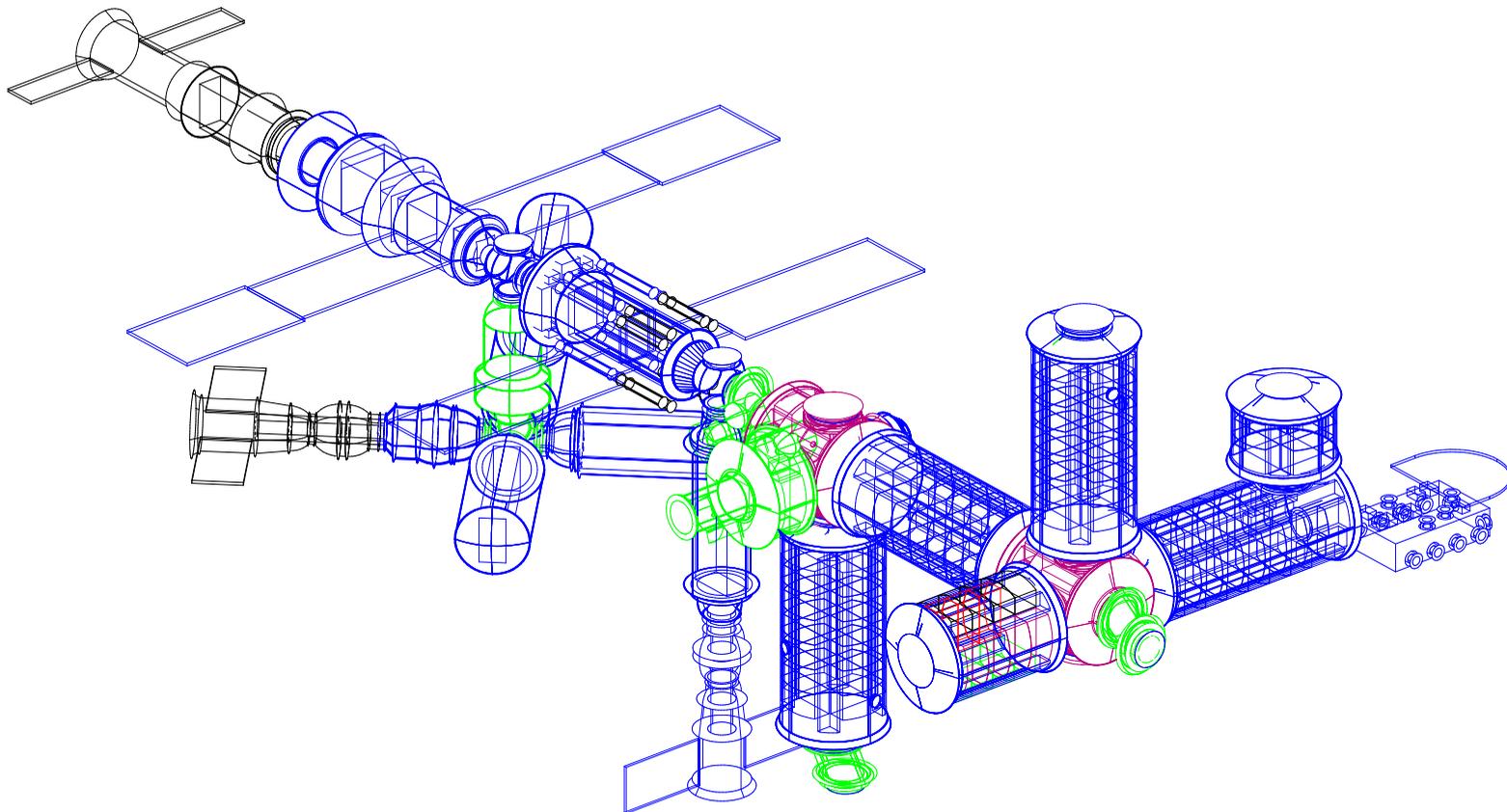


CURRENT MODELS

- International Space Station Model

- Written 1995
- Autocad model uses Al equivalent material
- High resolution in US portion of Station, Russian segments are very low resolution
- Updates and changes are more intuitive, but inefficient
 - Any model changes must be manually updated
 - High potential for introducing errors into the model
- Shield distributions are created using Cadrays, a DOS based Autocad add-in created for NASA-JSC
- Current system is slow and quite time consuming, with many files to create in the near future

Space Station CAD Model



FUTURE MODELS

- I - DEAS
 - Professional CAD modeling extension
 - Uses solid models already created and maintained by NASA JSC engineering groups
 - Can be applied to both Shuttle and Station shielding problems
 - Fast powerful software reduces shield distribution creation time (5 sec vs 2 hours)
 - Inexpensive – one time cost for ray tracing module
 - Updates and changes are no longer SRAG's responsibility
 - If included in the model, multiple materials can be included in shield distribution
 - Production of Shield Distribution files can be automated