AERONAUTICAL AND ASTRONAUTICAL ENGINEER

SPACECRAFT INTEGRATED DESIGN TOOLS

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The thesis surveys current software tools to design satellites and develops an integrated spreadsheet-based tool for preliminary spacecraft design. First, several existing and future design tools - both commercially available and company proprietary - are discussed and evaluated. Second, a spreadsheet-based design tool which is generally applicable to any earth-orbiting satellite is developed. Preliminary design of all satellite subsystems is performed on separate sheets of the Excel workbook. Based on user-entered orbital data, propellant and mass budgets are also calculated. The design technique and spreadsheet implementation is presented along with the underlying "first principles" theory and equations.

DoD KEY TECHNOLOGY AREAS: Space Vehicles, Computing and Software

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