New Developments at NASA's Instrument Synthesis & Analysis Laboratory

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Abstract: NASA's Instrument Synthesis & Analysis Laboratory (ISAL) has developed new methods to provide an instrument study in one week's engineering time. The final product is recorded oral presentations, models and the analyses which underlie the models.

OCIS codes: 110.0110 Imaging systems; 220.0220 Optical design and fabrication

1 ISAL Study Process

Rapid design of instruments for Earth and Space Science is the goal of the ISAL. The laboratory goes from a conceptual design or a measurement requirement to a modeled, analyzed and illustrated point design in as little as one week's time of the engineering team. ISAL provides the science customer with an exceptional engineering staff and a rapid, iterative engineering design environment throughout all the instrument subsystems. The customer participates throughout the entire study. The ISAL also responds to other requests such as: requirements definition, end-to-end concept studies, independent technical assessments and technology and risk assessments.

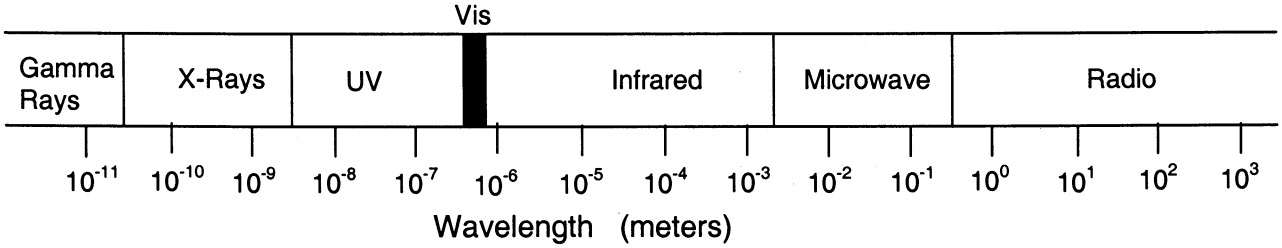
ISAL discipline engineers include: Instrument Systems, Science Liaison, Optical Design, Electro-Optical, Electrical, Electro-Mechanical, Opto-Mechanical, Structural Analysis, Thermal, Cryogenics, Detectors, Lasers, Flight Software, Risk Assessment and Cost Modeling.

2 New One-Week Engineering Study Capability

It has been found that some aspects of the instrument design process are serial in nature. For example, the optical design must be nearly complete before the full interactive study begins. And the Cost Modeling and Structural Analysis can only begin after the full Mechanical Design is complete. Thus the ISAL has developed a study that costs the customer one week of engineering time but is spread over three weeks. The ISAL Optical Designer works the optical design to near completion before the study begins. The nearly full-staffed interactive study is executed in a one week period culminating with a formal presentation from all discipline areas except for Parametric Costing and Thermal and Structural Analysis. In the third and wrap-up phase, the cost, thermal and structural analysis are completed and briefed to the Customer Team. The final product is a CD with all the engineering and cost analyses, models, and presentations available for use in proposal preparation.

3 Large Wavelength Coverage for All Scientific Disciplines

The ISAL supports studies for instrument concepts in Space Science, Earth Science and Exploration, and the instruments developed make measurements at wavelengths across the entire electromagnetic spectrum.



From x-ray sky surveys to UV-visible instruments for solar and planetary physics to passive and active microwave radiometers for Earth observing, the ISAL covers the spectrum.