

The cylindrical/conical shell enclosing the cavity is machined from copper, which is chosen for its high thermal conductivity. In use, the shell is oriented vertically, open end facing up, and inserted in a Dewar flask filled with isopropyl alcohol/dry-ice slush. A flange at the open end of the shell is supported by a thermally insulating ring on the lip of the Dewar flask. The slush cools the shell (and thus the blackbody cavity) to the desired temperature. Typically, the slush starts at a

temperature of about 194 K. The slush is stirred and warmed by bubbling dry air or nitrogen through it, thereby gradually increasing the temperature through the aforementioned calibration range during an interval of several hours. The temperature of the slush is monitored by use of a precise thermocouple probe. A comparison with an independently calibrated commercial radiometer with a thermocouple demonstrated less than a 1 K difference between a thermocouple in the slush

and the radiometer's output. The flow of dry air also acts as a purge to prevent airborne water vapor from frosting the conical and cylindrical cavity surfaces.

*This work was done by Dane Howell, Robert Ryan, Jim Ryan, Dane Howell, Doug Henderson, and Larry Clayton of Stennis Space Center.*

*Inquiries concerning rights for the commercial use of this invention should be addressed to the Intellectual Property Manager, Stennis Space Center, (228) 688-1929. Refer to SSC-00193.*

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## KML Super Overlay to WMS Translator

*NASA's Jet Propulsion Laboratory, Pasadena, California*

This translator is a server-based application that automatically generates KML super overlay configuration files required by Google Earth for map data access via the Open Geospatial Consortium WMS (Web Map Service) standard. The translator uses a set of URL parameters that mirror the WMS parameters as much as possible, and it also can generate a super overlay subdivision of any given area that is only loaded when needed, enabling very large areas of coverage at very high resolutions. It can

make almost any dataset available as a WMS service visible and usable in any KML application, without the need to reformat the data.

With the proper configuration, very large datasets that exist in WMS can become layers in a KML-enabled client. For example, Google Earth natively uses KML for data access and is both popular and available. This KML to WMS translator makes Google Earth act as a WMS client and can be used to make NASA remote sensing data more accessible, thus

enabling exploration, collaboration, and education efforts. Simulated or modeled data available in WMS can become available in KML. This tool can be used for remote imagery of other planets, the Moon, and Earth.

*This program was written by Lucian Plesea of Caltech for NASA's Jet Propulsion Laboratory.*

*This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (626) 395-2322. Refer to NPO-44684.*

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## High-Performance Tiled WMS and KML Web Server

*NASA's Jet Propulsion Laboratory, Pasadena, California*

This software is an Apache 2.0 module implementing a high-performance map server to support interactive map viewers and virtual planet client software. It can be used in applications that require access to very-high-resolution geolocated images, such as GIS, virtual planet applications, and flight simulators. It serves Web Map Service (WMS) requests that comply with a given request grid from an existing tile dataset. It also generates

the KML super-overlay configuration files required to access the WMS image tiles. This server can sustain extremely high request rates with very short request latencies in both WMS and KML protocols. It does not require significant computer resources and can operate from read-only media.

This server makes it possible to support very demanding interactive or immersive applications that require geo-

graphically located data. It has direct applications for making NASA data such as remote sensing and modeled or simulated data available to applications like WorldWind or Google Earth.

*This program was written by Lucian Plesea of Caltech for NASA's Jet Propulsion Laboratory.*

*This software is available for commercial licensing. Please contact Karina Edmonds of the California Institute of Technology at (626) 395-2322. Refer to NPO-44685.*

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## Modeling of Radiative Transfer in Protostellar Disks

*NASA's Jet Propulsion Laboratory, Pasadena, California*

This program implements a spectral line, radiative transfer tool for interpreting Spitzer Space Telescope observations by matching them with models of

protostellar disks for improved understanding of planet and star formation. The Spitzer Space Telescope detects gas-phase molecules in the infrared spectra

of protostellar disks, with spectral lines carrying information on the chemical composition of the material from which planets form. Input to the software in-