

DIRSIG4 XML Inputs

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Overview




DIRSIG release 4.2.0 features new XML input formats. While the old CFG format will still be supported, all future scenes will be developed using the newer alternatives.

These formats use the Extensible Markup Language (XML), an HTML-like syntax. Most major programming languages support easy reading and writing of XML files, which makes writing external utilities much easier. The new formats also allow new features and capabilities to be added to DIRSIG.

This document outlines the new input files and how they are used. Complete documentation for the formats will be distributed with the DIRSIG 4.2.1 release. Note that the DIRSIG graphical user interface (`dirsig_edit`) reads and writes files using these XML formats.

DIRSIG's inputs have been separated into five XML input files. These are normally collected into a simulation manifest (`.sim`) file, but can also be supplied to DIRSIG individually. The following table lists the files and the associated GUI icon used for editing:

GUI Icon	File Extension	Description
	.scene	Scene configuration
	.atm	Atmospheric model configuration

	.platform	Platform and instrument configuration
	.ppd	Platform position information
	.tasks	Collection tasks

As mentioned, the individual XML configuration files are typically collected in a `Simulation Manifest` file with the ".sim" extension. The contents of such a manifest file is shown below:

```

<simulation>
  <scene externalfile="/dirsig/demo/foo.scene" />
  <atmosphericconditions externalfile="/dirsig/demo/foo.atm" />
  <platform externalfile="/dirsig/demo/foo.platform" />
  <platformmotion externalfile="/dirsig/demo/foo.ppd" />
  <tasklist externalfile="/dirsig/demo/foo.tasks" />
</simulation>

```

From the command line, DIRSIG can be run using this simulation manifest with the `-xml` flag:

```

prompt% dirsig4 -xml foo.sim

```

DIRSIG can also be invoked without a simulation manifest file by specifying the inputs individually:

```

prompt% dirsig4 -xml "" foo.scene foo.atm foo.platform foo.ppd foo.tasks

```

This manner of using DIRSIG is called "Component Mode". For trade studies, this can be very helpful when paired with some simple shell scripting. Note that the first "" is a placeholder for the options XML file, which does not yet exist.

Scene File

The scene file uses the ".scene" extension. It describes:

- The real-world location of the scene's local coordinate system. Specifically, where the local origin is

in latitude, longitude, and altitude.

- The directory paths in which supporting scene files are found.
- Landmarks, which will provide graphical interface hints in future releases.
- The geometry lists needed for the scene. These are supplied as ODB and glist filenames. (Glist is the XML replacement for ODB being introduced in release 4.2.1).
- The property maps present in the scene. This includes material maps, texture maps, etc.

Atmospheric Conditions File

The atmospheric conditions file uses the ".atm" extension. It describes:

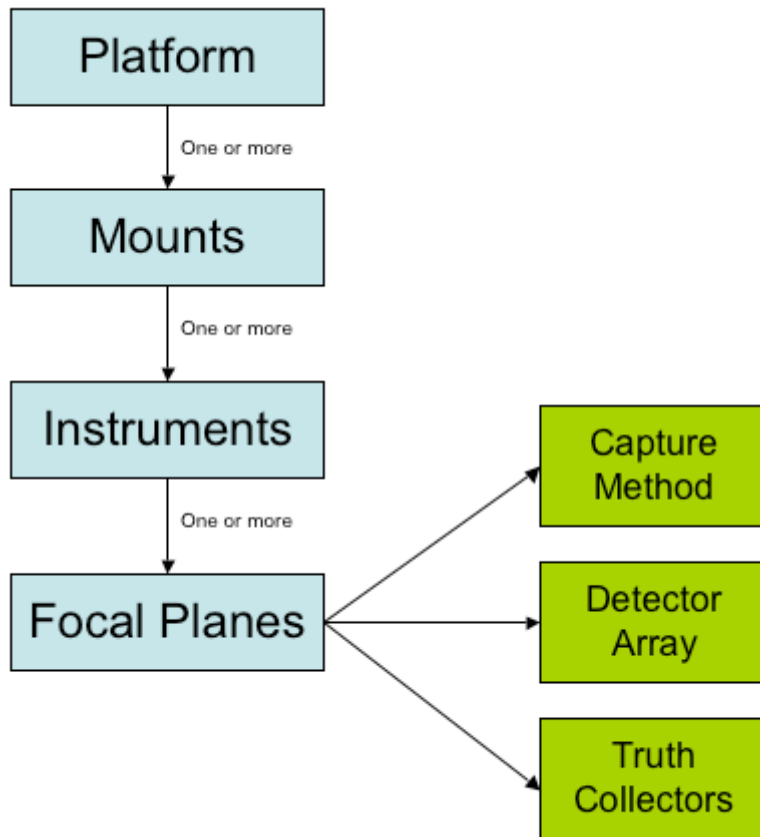
- The weather history (.wth) file being used. This is needed, for instance, by DIRSIG's thermal model.
- The atmospheric model being used. Currently, the "Classic" MODTRAN-based and the "Simple" atmosphere models are supported.

Platform File

The platform file describes the platform, mounts, and instruments. It uses the ".platform" extension. It details:

- The *mounts* attached to the platform. A mount can be static (fixed) or moving as a function of time. For example, the WASP imaging system at RIT consists of a gimbal with four cameras attached; it swings laterally to sweep the cameras across the scene.
- The *instruments* attached to each mount.
- Each instrument has
 - a focal length
 - one or more *focal planes* which in turn have
 - a "capture method" describing how the focal plane operates
 - a "detector array" description
 - zero or more truth collectors

The following diagram shows the relation between the components in a platform file:



Platform Motion File

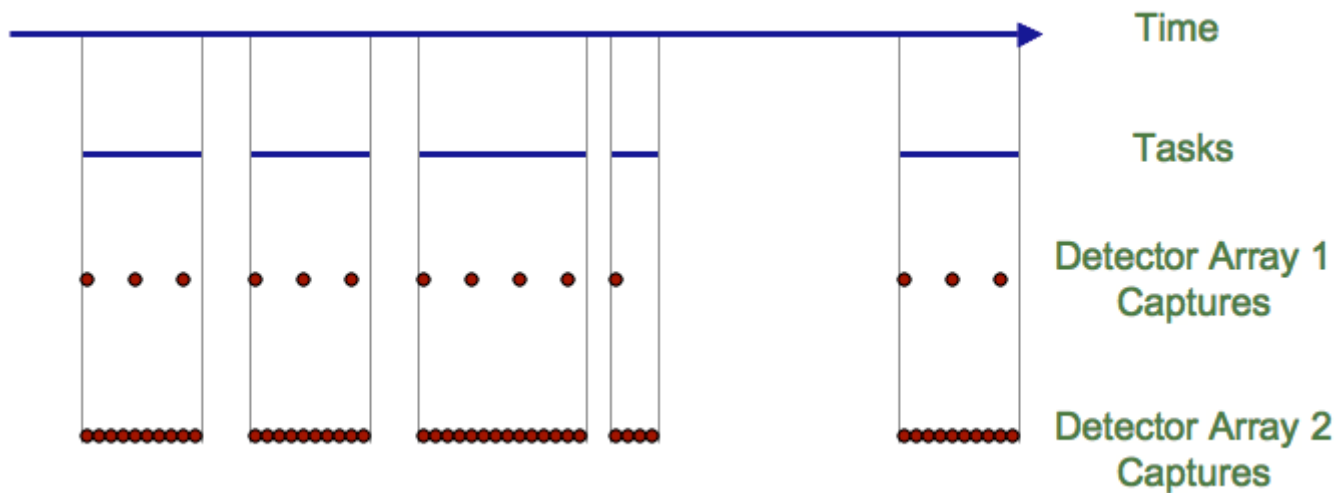
The platform motion file uses the ".ppd" extension. It describes the platform's position and orientation as a function of time. DIRSIG will linearly interpolate between supplied entries as needed.

Tasks File

The tasks file uses the ".tasks" extension. It indicates:

- The simulation reference time, supplied using the ISO8601 format.
- One or more tasks, each indicating time periods during which to capture data. (The "on/off" switch for the instruments).

The following diagram illustrates timing in DIRSIG. Note that each detector array can have a different sampling rate. In the example "Detector Array 2" is imaged four times as often as "Detector Array 1".



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