PYRISE AND OTHER PLANETARY SCIENCE PYTHON TOOLS K.-Michael Aye, Laboratory of Atmospheric and Space Physics, University of Colorado at Boulder, CO, 80303 (Michael.Aye@colorado.edu)

Introduction　I describe Python packages I developed during my work with instrument data from several planetary science space missions. The instruments these packages can be used for are:

- MRO HiRISE (imager)

- Cassini ISS (imager) and UVIS (spectrometer)

- Maven IUVS (spectrometer)

Furthermore, I present a small collection of mission-independent utilities that I collected in package called 'planetpy' and I present a draft layout for further discussion how these different packages could be either combined or co-located into a common GitHub organization.

pyRISE　The MRO HiRISE image is a very complex imager which is reflected in the complexity of the PDS data-set, which contains 2 channels per CCD, with 10 RED channel CCDs, comprising 20 files per recorded observation ID. Additionally, there a two color channels named IR for infrared and BG for blue-green, each having 2 CCDs with also 2 channels per CCD. All these products need to be correctly identified when processing or analyzing these images, requiring a lot of detail already simply in a filename. To make this process bearable I mirrored the complete product chain of existing HiRISE products for both label and image files and the 'pyRISE' package provides interfaces to create these filenames and their paths dynamically via string operations.

The paths are also correctly aware of the filepaths on the PDS server, so that automatic download of the correct HiRISE product is easily facilitated. For example:

```
from pyrise import products as prod

pid = \
  prod.PRODUCT_ID('PSP_003072_0985')
print(pid.jp2_path)
```

will return the rather complex path `RDR/PSP/ORB_003000_003099/PSP_003072_0985/PSP_003072_0985_RED.JP2`.

Furthermore, I added a command-line tool for Macs that can download and display the official HiRISE preview jpg. The package also helps in creating full HiRISE mosaics, starting from the 20 RED CCD channels, using the USGS' ISIS3 toolset.

Anticipated presentation　I will summarize the capability of the offered tools and try a live-demo of a set of examples, including:

- Creating a correctly constrained Maven IUVS and Cassini UVIS spectral-image plots using PDS data

- Finding, downloading and calibrating Cassini ISS images

- Previewing and managing HiRISE images easily.