

3D Visualization of Solar Data

Preparing for Solar Orbiter and Solar Probe Plus

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Abstract

The next generation of ESA/NASA heliophysics missions, Solar Orbiter and Solar Probe Plus, will focus on exploring the linkage between the Sun and the heliosphere. These new missions will collect unique data that will allow us to study the coupling between macroscopic physical processes to those on kinetic scales, the generation of solar energetic particles and their propagation into the heliosphere and the origin and acceleration of solar wind plasma.

Within a few years, the scientific community will have access to large volumes of complex remote-sensing and in-situ observations from different vantage points, complemented by petabytes of simulation data. Answering overarching science questions like "How do solar transients drive heliospheric variability and space weather?" will only be possible if the science community has the necessary tools at hand to visualize these data and assimilate them into sophisticated models.

A key piece needed to bridge the gap between observables, derived quantities like magnetic field extrapolations and model output is a tool to routinely and intuitively visualize large heterogeneous, multidimensional, time-dependent data sets. The open-source JHelioviewer software, which is part of the ESA/NASA Helioviewer Project, is addressing this need. This poster highlights recent extensions of JHelioviewer's functionality.

Solar Orbiter & Solar Probe Plus



JHelioviewer: New Features

3D Support

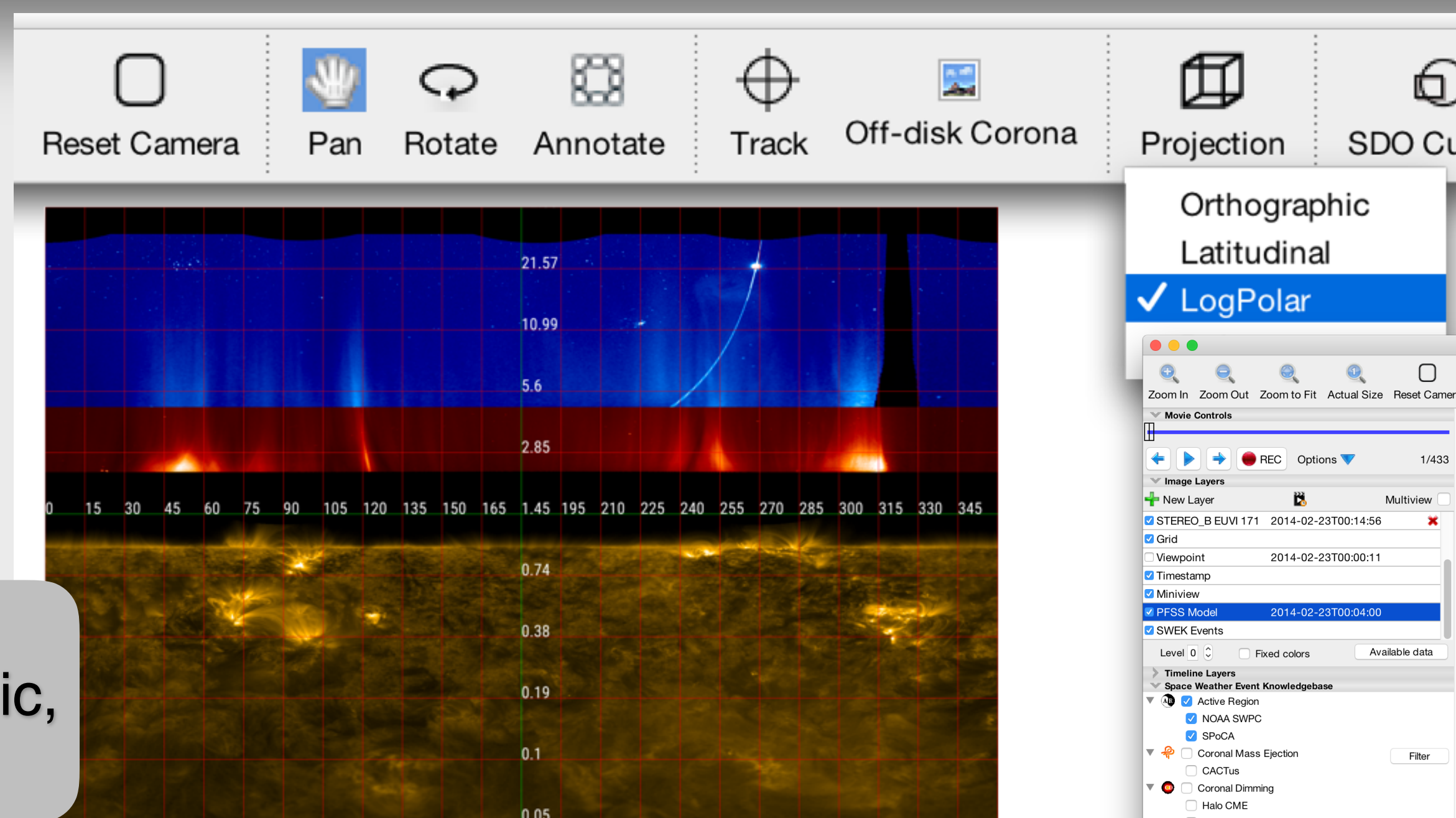
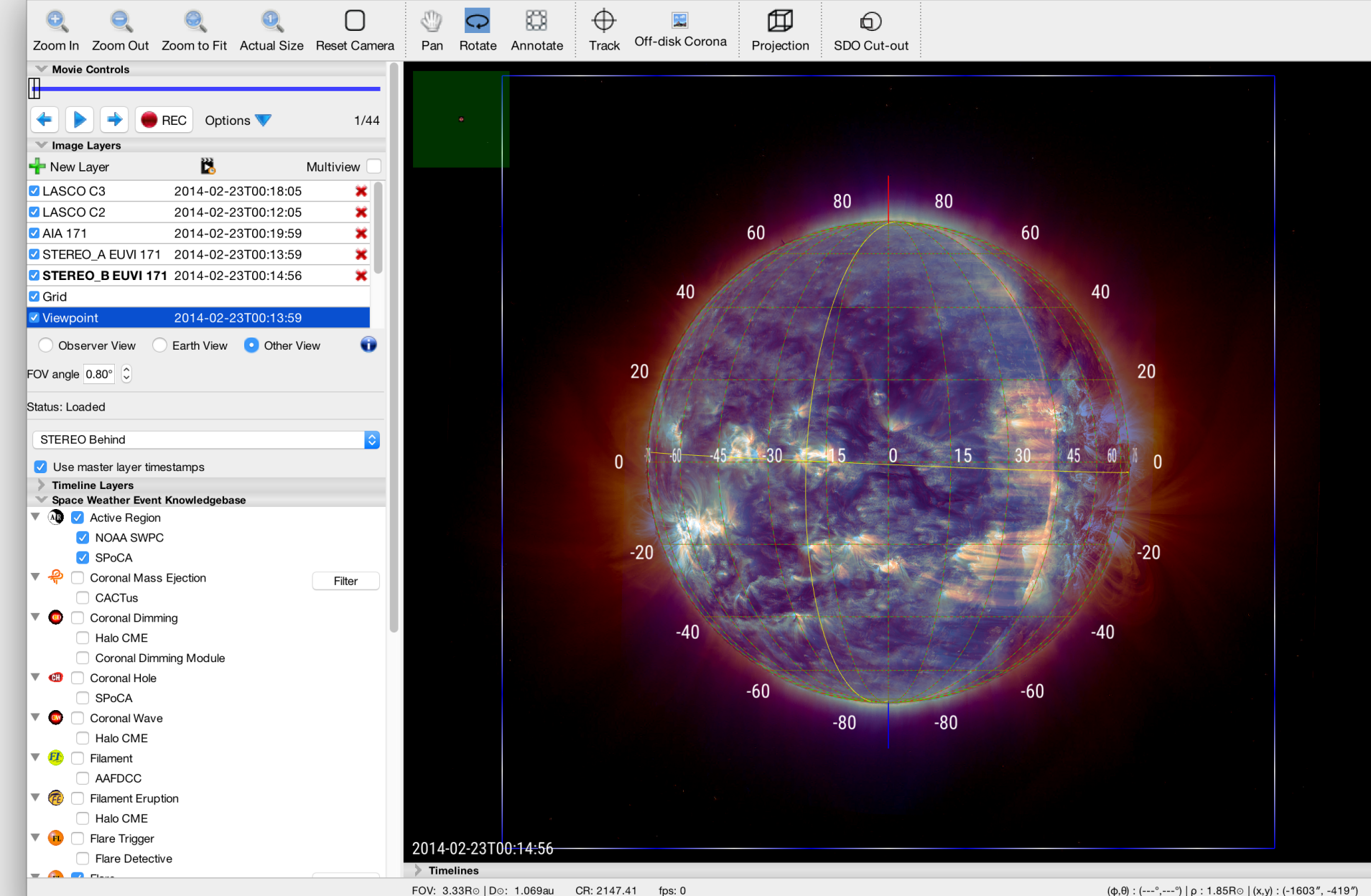
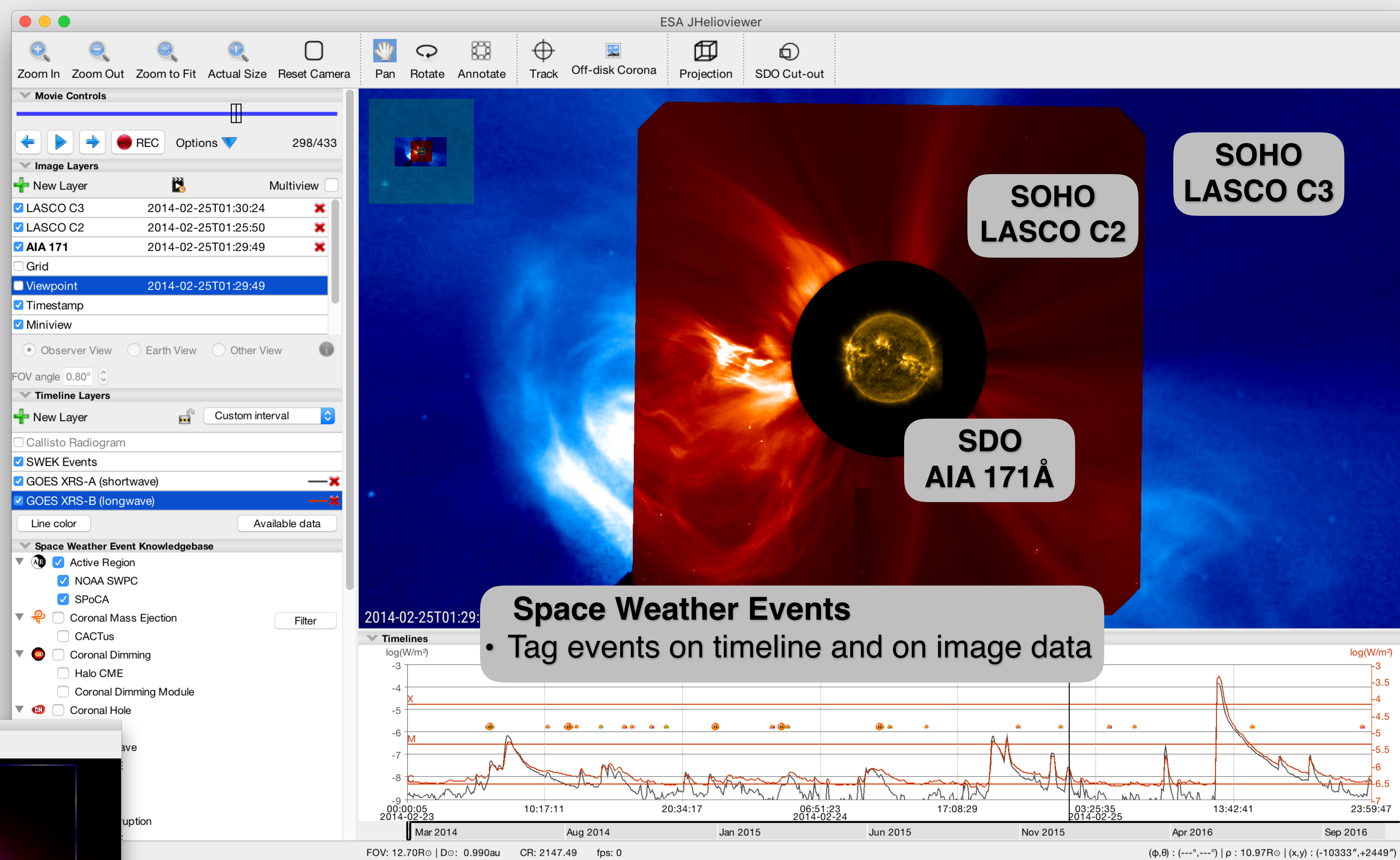
- Overlay data taken from different viewpoints
- Rotate scene
- Show magnetic field lines
- Display data in various projections (orthographic, latitudinal, polar)

Difference Imaging

- Render running and base differences in real-time

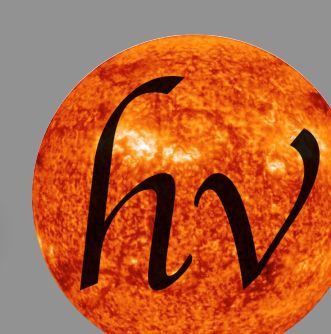
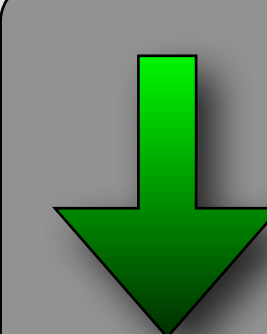
Virtual Camera

- See the Sun from any viewpoint, e.g. spacecraft trajectories, planets



Next Development Phase (Feb 2017 onwards)

- Improve interoperability and data access: enable users to download science data using VSO and ESA science archives, communicate with SunPy and IDL/SolarSoft
- Initiate support for Solar Orbiter science operations planning
- Continuously improve usability: temporal navigation, event filtering, command line interface



Download at
jheliviewer.org