News from The Society for Astronomical Sciences

Vol. 7, Number 3

2010 SAS Symposium will be a joint meeting of the SAS and the CBA—Call for Papers from Both Groups

This year's organizational meeting was held a bit later than usual, on December 9, 2009. Participants participated by webcam so the SAS saved the expense of bringing everyone together in one place. It went well although not everyone could participate. I had difficulty getting the software to download so was not present. Several things of note have been decided.

This year the SAS Symposium will be a joint meeting with the CBA spanning 3 days of meetings. The meeting will be held May 11-13 (Tue - Thu), 2010. The AAVSO will be having a meeting at Northwoods also and will have their business meeting on Monday May 10.

It was decided that on even years the SAS and AAVSO will have joint meetings from this point forward. The next one will be 2012.

It will be held at the Northwoods Resort in Big Bear, CA. The approximate cost of the rooms is $100 with the group rate. Northwoods should be contacted directly by you and mention the SAS for discount.

Registration will be $45 for members ($55 after May 1) and $60 for non-members ($65 after May 1). You need to be a member of SAS. Membership in SAS is $25/year. The dinner will be about $35 on Thursday evening. As in the past we will be having workshops on Tuesday, paper sessions on Wednesday and Thursday with evenings being free for networking. The cost will be $50 and the nature of the workshops is described in a separate article in the Newsletter.

Deadlines of Importance

Abstract: March 14, 2010, 00:00 UT

Papers due: April 11, 2010, 00:00 UT

Presentations

The final length of time for the talks is still in discussion.

Proceedings

The committee has decided to revert back to the published proceedings format for 2010. This in combination with the earlier-than-usual date for the Symposium means you will need to get to work on those abstracts and papers!

Continued on page 2, SAS 2010

In This Issue

Workshops for the 2010 SAS/CBA Joint Meeting

This year at the 2010 Symposium on Telescope Science, (May 11-13, 2010) we will have two workshops. These will be held on Tuesday, May 11, 2010 and will be 3 hours in length.

The first workshop will be given by Olivier Thizy, President of Shelyak Instruments. As many of you know Olivier is a very dynamic speaker and his company manufacturers the LIHRES III and Star Analyzer spectrographs. He has a keen interest in Be type stars and has in the past, presented at SAS Symposiums some of his work. This year we have asked him to give a workshop on the practical aspects of spectroscopy using spectra he has taken with his instruments. Toward this end he has selected two parts for his presentation:

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SAS 2010

Submission formats

Microsoft Word 2003/2007, OpenOffice (cross-platform freebie that simulates/works with MS Word), NO PLAIN ASCII text.

Submission rules

Use the Word template on the SAS web site as a style guide if not actual template. Graphics or tables that are wider than 1 column should be placed in a text box. Do -not- use continuous breaks to switch from 2 to 1 back to 2 column formatting. Send graphics as separate files even if they are also embedded in the document. GIF/PNG preferred for non-photo images (plots, etc.). Photos can be GIF/PNG/JPG. Do not embed or Excel spreadsheets. Convert them to tables and put them in a text box. Poster presentations will be accepted. For inclusion in the proceedings, you can format the material as a regular paper or a single page graphic.

Membership Information

Membership in your Society for Astronomical Sciences (SAS).

As was pointed out with the last issue, it was felt that a modest membership fee would greatly help SAS to produce a better product for its members. This fee will be $25.00 per year. What will this membership fee provide? Well for one thing it WILL NOT go to any committee members as part of their efforts within SAS. We volunteer our time for The Society.

Members will receive a discount for the registration fee each year for the Symposium at Big Bear. It will assure you that you will get a copy of the published proceedings each year, even if you do not attend the Symposium. It will help defray costs in bringing in outside speakers (professionals) to the symposium.

Membership is annual and runs from July to June of the following year. To become a member, send $25 to: Society for Astronomical Sciences, 8300 Utica Avenue, Suite 105, Rancho Cucamonga, CA 91730. You may also join online at the registration page of the web site. Membership dues are tax deductible.

We currently have 105 members with all renewals due in by June 1.

The SAS is a 501(c)(3) charitable organization.

Your Participation Wanted!

As I have mentioned in previous Newsletters, we need your participation in the Newsletter. We don't want this to become a one person or just a couple person show. If you have an article which can cover a variety of topics, please put it together for a future Newsletter. Work in progress is always welcome. In addition, we have started a "letters to the Editor" section where we would like to add 2-3 letters from the members/participants. We had no letters to incorporate into this Newsletter edition. Constructive comments are always welcome as we are always looking for ways to improve not only the quality of the Newsletter but also the quality of the Symposium. We want the SAS to become a year around organization not just a once a year group.

Workshops 2010, cont. from pg 1

1/ Measure the temperature of stars using low resolution spectra (he will provide raw spectra taken with the Star Analyzer), using the Planck curve function. This should take about 1h30 and software used will be IRIS & VisualSpec (free software).

2/ Measure line profiles (Line center, Equivalent Width, FWHM, V/R ratio...) in high resolution spectra and link to the astrophysical meaning of those measures (for example in Be stars). This should also take about 1h30. He will mainly use VisualSpec there and provide spectra for people to use.

The second workshop will be given by Richard Berry, co-author of the popular image processing book and software, The Handbook of Astronomical Image Processing. The workshop is called The Calibration of a CCD Camera. It will be a hands-on workshop with the participants divided up into 5 groups, one of which we will ask to bring their CCD camera and control computer which will be used by the group. The other members of the group will be taking and reducing the measurements on the camera. Controlled light sources will be provided to each group for these measurements. Most of us typically have an idea about the gain, read noise, bias, linearity, dark current, conversion factor and uniformity of our cameras, but how many of us have actually measured these parameters? By attending this workshop you will not only learn how to perform these tests on your camera but what each parameter means and what effect it has on your images.

The cost of each of these workshops will be $50 each payable in advance. As the attendee list is finalized we will send out links to each so that the required software and test images can be downloaded and installed. The cutoff date for registration for these Workshops will be May 5, 2010 in order to allow attendees to have the required software pre-loaded onto their computers.

The workshops this year are a continuing effort to bring our Symposium attendees information that will jump start and/or fine tune the use of their equipment in the pursuit of astronomical science.

A Meteor Observatory at GMARS and the Tale of Photogenic Fireball

By Ralph Megna

Several years ago, Riverside Astronomical Society member Bob Stephens received an all-sky meteor camera from Sandia National Labs in New Mexico, which built and handed out several dozen of them to be part of an observation network aimed at gathering data on fireballs. Unfortunately, when it arrived, there were a number of on-going development projects at the RAS dark sky site, the Goat Mountain Astronomical Research Station[1] (GMARS), and it was more than a year before attention was turned to deploying the new observing tool.

But inspired (or maybe shamed) by a spirited noontime discussion of the Sandia cameras at the SAS meeting in May 2009, Bob and I decided it was time to get ours operational. Within a month, and with the assistance of fellow RAS member Charlie Knapke, we erected a stand-alone pier for Sandia Labs camera at GMARS. Located roughly 50 feet east of the stationhouse, away from any trees and above the nearest roofline, the pier would give the camera a nearly unimpeded 360-degree view of the sky.

The engineering for this pier was a bit unorthodox. It started with ten-foot length of six-inch plastic (PVC) drain pipe. This was chosen because the bottom of the meteor camera had a standard plastic pipe flange as its mounting element and it was easy to purchase the complementary flange and adapter for the pier pipe. The pipe itself was put several feet into the ground and set in concrete.

However, the pipe itself was very flexible, so to stiffen it, we poured concrete in from the top and filled its length. Additionally, the vertical assembly was stabilized with three steel anchor cables. The resulting pier presents a thin profile to the desert winds and provides a very stable platform for the meteor camera.

The Sandia Camera

The meteor camera itself consists of a highly-sensitive video camera equipped with a fisheye lens and automatic iris. The plastic housing also contains a fan and dew heater, and is topped with a clear dome. Power and a video cable travel down the length of the pier where, at the bottom, a utility box provides an interface that digitizes the video signal and transmits it over Ethernet. A control computer, running Python-based Sentinel software from Sandia Labs, completes the system.

Prior to activating the camera, it was necessary to adjust the system to optimize its capacity to "see" meteors and capture their trails in video. Thanks are in order to Robert Crawford of the Arizona Desert Fireball Network, who provided us with a detailed how-to adjustment and calibration guide for the camera. As it is currently set, the Sentinel is capable of recognizing meteors that are brighter than -1.5 magnitude and captures their travel at an imaging rate of 30

[1] See Society for Astronomical Sciences newsletter, Volume 5, Number 1, page 5 (2007), for an article by this author on the development of GMARS in the high desert near Landers, California

Sentinel camera

Wally Pacholka captures Geminid

frames a second. The sky is covered in a frame that is approximately 520 pixels across, from horizon to horizon.

After testing the Sandia camera with one of our laptops, Bob and I decided that it would be best if it had a computer dedicated to its operation. Fortunately, there are many inexpensive desktop systems on the market these days and we were able to purchase a capable Windows XP machine based on Intel's Atom processor, complete with a large LCD screen, for less than $350. It is worth noting that Python runs on Windows, Linux and MacOS, and is not especially processor-intensive, so we could have used an older computer running any of these operating systems.

Initially, we put the control computer on a wooden roll-around cart and ran the camera from a patio outside the stationhouse. While this arrangement was fine during the balmy evenings of summer and the early fall months, the advent of cold weather has underscored its limitations and the system has been parked indoors. We expect to permanently put the power and Ethernet connections into underground conduit from the house to the camera in the very near future.

Going Operational

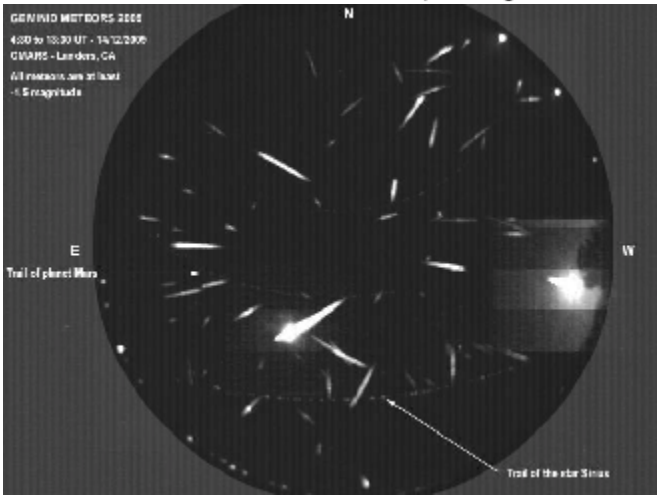
The weekend of 27 June 2009 was the Sentinel camera's first real operation, and we had the system watching both Friday and Saturday night. Between the two nights, we captured several certain fireballs. We were very pleased.

But we were also somewhat dismayed by the fact that these "real" meteors were buried in numerous false events triggered by nearby car lights or electronic noise in the video system. It took several weekends of experimenting with different settings and configurations for the digital mask in the Sentinel software to significantly reduce the "false positives." Interestingly, the software does a very good job of discriminating between meteors and other sky phenomenon such as the flashing navigational lights on passing planes, although it still occasionally logs an event triggered by a bright planet such as Venus or Jupiter.

We are currently limiting observations to weekends when we are at GMARS, but we expect to be able to configure the system to run continually in the future, perhaps with remote accessibility to the data. Eventually, we hope to coordinate our work with others, especially sites within 150 miles or so. By creating a network of stations - a sort of virtual meteor observatory - we could do entry vector and even orbit determination based on triangulated observations. Such data would be of great value to professional meteor researchers.

Tale of a Geminid Bolide

One of the weekends that the Sentinel camera was operating was 13-14 December 2009, during the annual Geminid meteor shower. NASA researchers have noted that the Geminids have been slowly growing more intense in recent decades and were predicting a good show. At GMARS, the event exceeded all expectations; casual counts by several observers indicated a zenith hourly rate (ZHR) of between 120 and 200 meteors per hour between 9 PM and midnight local time, roughly coincident with the predicted maximum for the Geminids. For the author, it was easily the best annual shower he has ever witnessed (excluding the 2001 Leonid meteor storm).



Output from Sentinel Camera

A Meteor Observatory at GMARS and the Tale of Photogenic Fireball

Ralph Megna

Although the human observers at GMARS called it a night after three hours outdoors in near freezing conditions, the Sentinel meteor camera kept running until dawn. During that time it captured the trails of 66 meteors that were brighter than the all-evening presence of Sirius – easily a one night record for the system at GMARS. Several of these were fireballs that displayed multiple bursts as they traveled through the sky.

A composite image of the dozens of meteors captured that evening was circulated among active members of the RAS immediately after the shower. A fireball that may have been as bright as the full moon, recorded as it neared the horizon, caught the eye of Alex McConahay. Alex had been corresponding with well-known astronomical landscape photographer Wally Pacholka and was in receipt of an early copy of a stunning image of a Geminid bolide shot by Wally at a site about 32 miles to the northwest of GMARS. The picture would quickly receive world-wide attention as it was first published on National Geographic's website, and a few days later, was the Astronomy Picture of the Day (APOD - http://antwrp.gsfc.nasa.gov/apod/ap091217.html).

Alex contacted me about the time stamp on the meteor event from the Sentinel camera, and did the same with Wally. After making adjustments for a computer clock not reset from daylight savings time, it was clear that the two images were taken within seconds of each other on Monday morning at 03:29 AM. The differences in the exact time were easily within the range of drift for two independent, non-coordinated devices.

This, in turn, led to an effort to triangulate the location of the meteor at the time of its greatest brightness. Since Wally's camera was not calibrated to map the position of the meteor, TheSkyX was used to recreate the scene to determine the general direction of the meteor's fall. That cardinal information, combined with the alignment from the GMARS Sentinel camera, provided a rough triangulation of the location of the meteor when it was roughly 30 to 40 miles above the ground. That location turned out to be about 60 miles west of GMARS, near the Cajon Pass in San Bernardino County, California. Doubtless, there were some security cameras in the vicinity that recorded a tremendous flash as the meteor burst nearly overhead.

This unexpected exercise in fireball forensics has stimulated new interest in refining the alignment and calibration of the GMARS Sentinel camera so it could contribute more accurate timing and positional data to triangulation projects. Perhaps future efforts will determine not just the location, but also the path of incoming meteors, providing guidance for possible recovery efforts for materials that might have made their way all the way to earth.

Zeroing in on the Fireball