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NIGHTSCAPE

A PUBLICATION OF THE INTERNATIONAL DARK-SKY ASSOCIATION

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FROM THE IDA PRESIDENT

IDA ENTERS A NEW SEASON

Dear Members,

Those of us who follow celestial developments know we recently experienced the solstice, the transition to a new season. In parallel, the IDA is transitioning to a new season of its own, as we bid farewell to former IDA Executive Director Bob Parks. Having served us ably for more than four years, Bob has left to pursue his passion for night sky conservation in new ways.

Before coming to IDA, Bob founded the Virginia Outdoor Lighting Taskforce, an all-volunteer, non-profit, grassroots advocacy group that has worked for efficient outdoor lighting since 2000. In 2009, Bob joined IDA to open the Washington Office for Public Policy and Government Affairs and was appointed Executive Director in 2010. During Bob's tenure as Executive Director, he steered IDA through the challenging U.S. financial crisis and strove to realize his vision for the organization and preservation of night skies. The IDA Board and Staff wish him well as he pursues new endeavors.

A Search Committee has been formed and is hard at work finding our next Executive Director. During this transition, Managing Director Scott Kardel is serving as our Acting Executive Director. The Board is fully confident that Scott and the entire Tucson staff will continue to effectively devote their talents and passion toward fulfilling IDA's mission.

I'm convinced that 2014 – the first year of IDA's second quarter-century – is an exciting and vital time for IDA. Public awareness about light pollution continues to grow and IDA is perfectly positioned to move this issue from public awareness to full-scale public action. Changing how the world thinks about light at night is a critical mission, but we can't do it without your help. As we look ahead, we are open to new ideas and approaches to accomplishing our mission. Your ideas and support are welcomed and encouraged. Please feel free to contact me at jim@darksky.org. Together, we really can change the world.

I hope you enjoy this issue of *Nightscape.* It's packed full of exciting content including information on an innovative outdoor lighting law in Chile, an "Ultra HD" astrophotography expedition, new International Dark Sky Places, light pollution research, IDA updates and much more. As always, there's too much going on to fit into one issue. So, if you haven't already, subscribe to our e-newsletter *Night Watch*. Look for the "Join Our Mailing List" link near the bottom of IDA's homepage at www.darksky.org.

Thank you for being a part of the IDA family and supporting us during the next leg of our journey.

Sincerely,

Jim Dougherty, IDA President

COVER: An Ultra HD fish-eye view of the Atacama Large Millimeter/submillimeter Array (ALMA) located 5,000 meters above sea level on the Chajnantor Plateau in the Chilean Andes. Taken during the ESO Ultra High Definition Expedition. See "Catching the Cosmos" on page two. Credit: ESO/B. Tafreshi

The mission of the International Dark-Sky Association (IDA) is to preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting. IDA was incorporated in 1988 as a tax-exempt 501(c)(3) nonprofit organization. (FIN 74-2493011)

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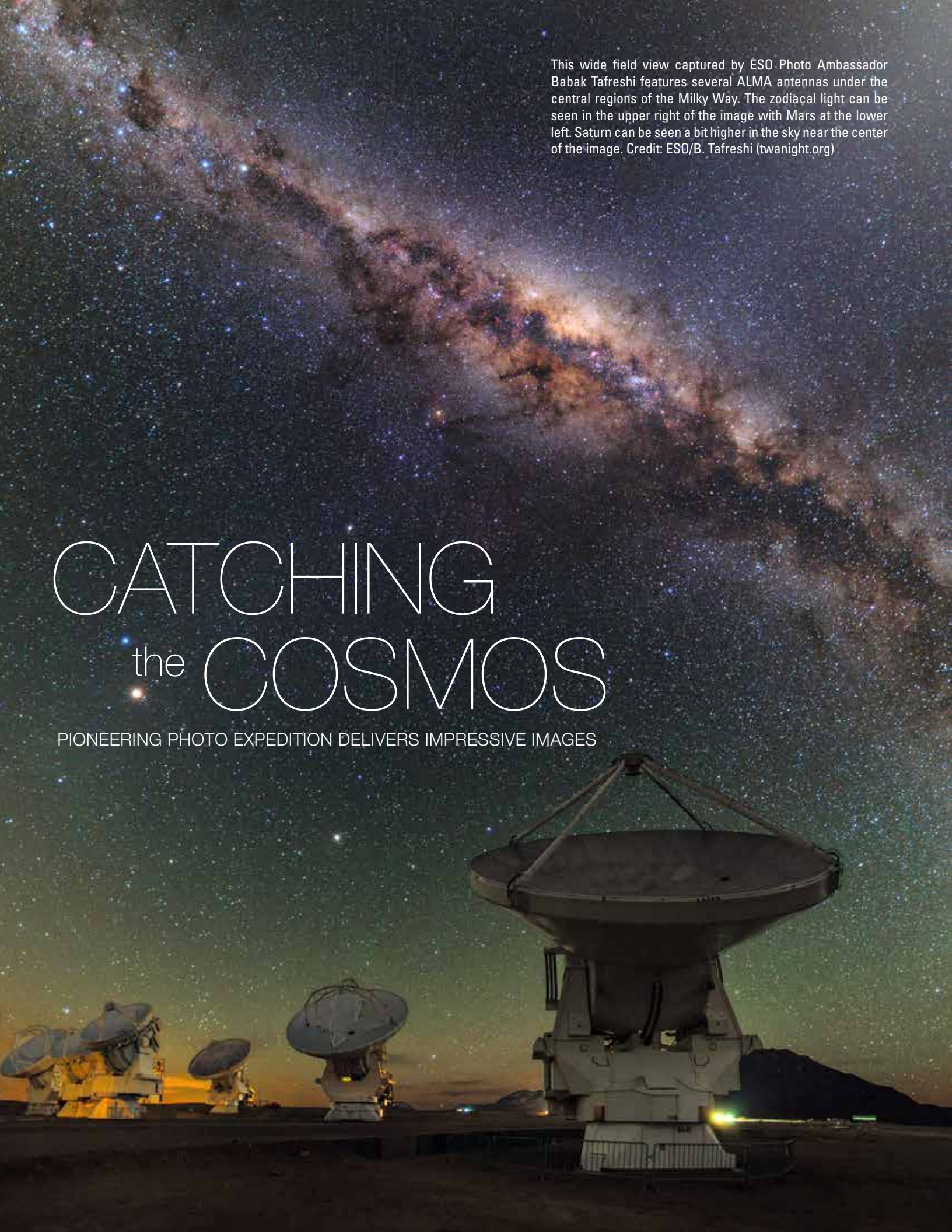
Address corrections: ida@darksky.org
Advertisements & submissions: editor@darksky.org
Nightscape is a publication of the International Dark-Sky Association.

CONTACT

Address: International Dark-Sky Association
3223 N. First Ave., Tucson, AZ 85719 USA
Tel: +1 520 293 3198
Fax: + 1 520 293 3192
website: www.darksky.org
email: ida@darksky.org
For more information contact: editor@darksky.org



This wide field view captured by ESO Photo Ambassador Babak Tafreshi features several ALMA antennas under the central regions of the Milky Way. The zodiacal light can be seen in the upper right of the image with Mars at the lower left. Saturn can be seen a bit higher in the sky near the center of the image. Credit: ESO/B. Tafreshi (twanight.org)

CATCHING the COSMOS

PIONEERING PHOTO EXPEDITION DELIVERS IMPRESSIVE IMAGES

During the spring of 2014, a team of four world-renowned astrophotographers embarked on a 15-day pioneering expedition to capture the stunning night sky of the Chilean Atacama Desert using state-of-the-art Ultra High Definition technology.

In collaboration with the European Southern Observatory, the ESO Ultra HD Expedition team travelled to ESO's three astronomical observing sites in Chile to record Ultra HD – four times the resolution of conventional HD – and fulldome content including timelapses, videos, panoramas and stills.

Because the production of Ultra HD content is still relatively new, ESO is on the cutting edge as one of the first scientific organizations to regularly produce it. And nearly all of this content is provided for free on the ESO website.

The team consisted of four ESO "Photo Ambassadors": Yuri Beletsky of Belarus, Babak Tafreshi of Iran and Christoph Malin and Herbert Zodet of Germany.

Due to the prime atmospheric conditions of the Atacama Desert, ESO sites boast some of the world's best conditions for astronomical observations. "It is an amazing experience to be under an ideal night sky, a pure natural beauty unspoiled by urban lights," said Tafreshi, team member and founder of The World At Night (TWAN), an international night sky video and photography project. "There aren't many locations left on this planet where you can still experience a dark sky like this."

Observing the arc of the Milky Way over the desert horizon particularly moved Tafreshi. "The patchy glow of light is the galactic plane," he said. "It is billions of stars in our home galaxy shimmering from far above the horizon of our little planet."

The team took full advantage the latest technology to capture the night sky including a 4K Canon EOS-1D C camera, the Vixen Polarie Star Tracker that aligns to Earth's rotational axis and Angelbird's SSD2go PRO solid-state disks that safely store Ultra HD content in extreme outdoor conditions.

The pristine conditions of the Chilean desert, combined with talented photographers and state-of-the-art technology, resulted in spectacular images of the cosmos. According to Tafreshi, the photographers were committed to capturing the natural colors and appearance of the night sky. DSLR cameras have made it easy to produce stunning Earth and sky images, he said, but often the high saturation and contrast of those images don't represent the sky's natural colors.

"One of the challenges for our team was to deliver images of the night sky while avoiding montage, deep processing, or altering the natural colors and view," Tafreshi explained. "Some of these images can be used by educators and

A photograph of the ESO Ultra HD Expedition team at La Silla Observatory, the last of the three ESO Observatories photographed during their expedition (from left to right: Herbert Zodet, Christoph Malin, Yuri Beletsky and Babak Tafreshi). Credit: ESO/B. Tafreshi (twanight.org)

ESO Photo Ambassador Yuri Beletsky captured this nighttime view featuring Otto, one of the two custom-made ALMA antenna transporters used for repositioning the antennas. The twin vehicles are 20 meters long, 10 meters wide and 6 meters high with 28 tires each. The ability to relocate the antennas is part of what makes ALMA such a powerful telescope. This truck later relocated an ALMA antenna within the array, a tricky operation that takes about two hours and the intense concentration of the transporter team. Credit: ESO/Y.Beletsky

photographers as references for the natural colors of the night sky."

Although the images focus on the ESO observing sites, Tafreshi said their purpose and appeal goes far beyond astronomy. "We try to show how the night sky is an essential part of our environment," he explained. "These images can help those such as the IDA and TWAN in bringing the night sky back into our lives and preserving it for the future generations."

One doesn't have to travel to one of the Chilean observatories – which are generally closed to the public – to experience the spectacular night sky of the Atacama Desert. In fact, some of the expedition's footage is from other areas of the desert.

"The sky of a moonless night is enchanting to an unaided eye anywhere in the high altitude desert of Atacama," Tafreshi said. "You just need to be far from the few main cities in the area and the dusty mine industry."

La Silla has more than 300 clear nights per year, but on Day 13 of the Ultra HD Expedition, the team was forced to contend with this rare phenomenon. Due to the weather, the telescopes at the site closed around midnight and by 4 a.m. they were still closed. The team had no choice but to pack up head to bed. But first, ESO Photo Ambassador Yuri Beletsky captured this dramatic shot of the New Technology Telescope under the foreboding clouds. Credit: Y. Beletsky (LCO)/ESO

LEARN MORE!

Thanks to ESO for making the ESO Ultra HD Expedition photos available to the public. For more information on the Expedition, go to the ESO website at http://bit.ly/1lL6oF2.

An Ultra HD panorama shot of the VLT platform with the red shades of airglow visible overhead taken by ESO Photo Ambassador Yuri Beletsky. Credit: Y. Beletsky (LCO)/ESO

ESO OBSERVING SITES

ESO is an intergovernmental organization focused on the science and technology of astronomy. Headquartered in Garching, Germany, just outside of Munich, it operates three world-class observing sites in the Atacama Desert region of Chile: the Very Large Telescope array (VLT), Atacama Large Millimeter/sub-millimeter Array (ALMA) and the La Silla Observatory.

VLT

The first stop of the ESO Ultra HD Expedition was Paranal, home to the VLT, ESO's flagship facility for European ground-based astronomy. At 2,635 meters above sea level and 120 kilometers south of Antofagasta, Chile, the observatory is often high above the clouds. The telescope's adaptive optics system compensates for the blurring effect of the atmosphere by using a laser beam to create an artificial star as a reference.

As one of the world's best sites for astronomy – averaging 300 clear nights a year – the VLT is the most productive individual ground-based facility in the world. "Paranal is known as an astronomer's paradise," Tafreshi explained.

ALMA

Next, the team drove up to the Chajnantor Plateau, home to ALMA. At an elevation of 5,000 meters above sea level, ALMA is among the highest and driest astronomical observatories on Earth. Because of the extreme conditions of limited oxygen and moisture, the team was required to pass a medical examination before being allowed to make the ascent.

ALMA, an international partnership of Europe, North America and East Asia in cooperation with the Republic of Chile, is one of the largest astronomical projects in existence. It comprises 66 high-precision antennas that can act together as single giant telescope.

La Silla Observatory

The final stop of the ESO Ultra HD Expedition was La Silla, ESO's first observatory built 45 years ago. Located on the edge of the Atacama Desert, it is 600 kilometers north of Santiago and 2,400 meters above sea level. La Silla is home to the ESO 3.6-meter telescope and the 3.58-meter New Technology Telescope (NTT), the first telescope to use a computer-controlled main mirror, which was revolutionary at the time and paved the way for modern telescopes.

CHILE GETS RID OF THE BLUES

First National Lighting Policy to Address Color Content

From the tall peaks of its Andean foothills to the Atacama plateau, Earth's driest desert, Chile has drawn astronomers from around the world for decades. Many major astronomical observatories are located in the southern nation bounded by the volcanic backbone of South America and the deep waters of the South Pacific. Its clear, dark skies and typically dry conditions are prized for their benefit to scientific observations from the optical to the radio portions of the spectrum.

Realizing the economic impact of international investment in astronomy research, the Chilean government in 1998 adopted Decreto 686, one of the first-ever national policies regulating outdoor lighting for the purpose of reducing light pollution. That rule mandated controls on the upward emission of light, strict curfews for commercial and sports lighting, and efficiency standards for new lighting installations. It also established the Oficina de Protección de la Calidad del Cielo del Norte de Chile (OPCC), a government agency tasked with the preservation of the astronomically important regions of Antofagasta, Atacama and Coquimbo.

However, Decreto 686 left several issues unaddressed including the spectral (color) content of light. The rule did not anticipate the advent of new lighting technology – the white, light-emitting diodes (LEDs). Legal language was needed to regulate LEDs as a source of outdoor public lighting to control the proliferation of harmful short-wavelength light.

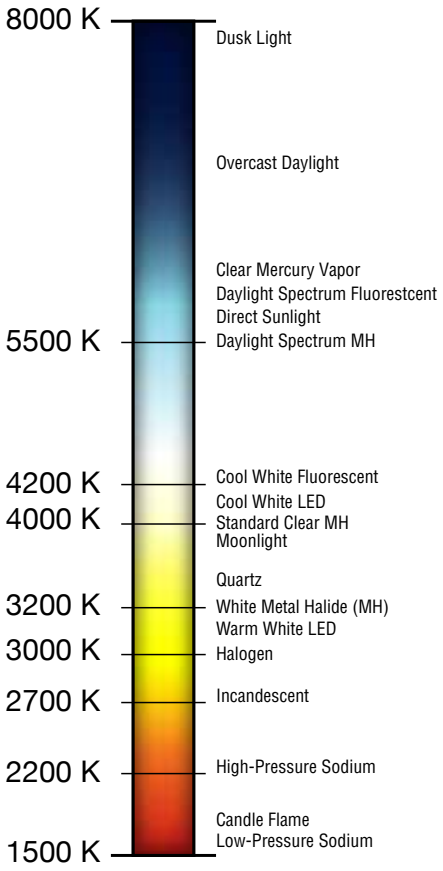
The color of outdoor lighting is as important as the intensity and direction of the light it emits. An increasing body of scientific evidence suggests that exposure to excessive amounts of blue light at night has deleterious effects on both ecology and human health. Blue light is also scattered over longer distances in the atmosphere than redder light, meaning that the glow of distant cities would otherwise become more harmful to the dark skies over Chilean observatories as those cities abandon the "warm" colors of light sources like sodium vapor for the "cooler" colors of white LED.

Some jurisdictions have addressed the issue of color by restricting the correlated color temperature (CCT) of lamps. The CCT is a shorthand way of describing the color of a light source, as shown in the figure to the right. As the CCT increases, the dominant colors in the light source shift progressively away from reds and toward blues. While CCT is in widespread use as a means of indicating the overall color of a light source, it does not specify exactly how the emitted light is distributed over the spectrum.

In 2011, the OPCC proposed to the Chilean Environment Ministry a series of changes to the law. After more than a year of discussions and negotiations, including a public comment period and an internal government review, Decreto 43 was published in December 2012 and took full effect the following May.

At the time, the OPCC wrote on its website that "It is hoped this modernizing legislation may preserve the unique character of the night skies in Chile's northern regions and prevent its future deterioration, regulating the emergence of new outdoor lighting technologies in a proactive way."

Decreto 43 is a major innovation because it is the first national-level policy specifying the permitted color content of outdoor lighting. The new rule limits emission of light in the blue and near-ultraviolet light parts of the spectrum to no more than 15 percent of the total amount of light emitted in the other visible colors. This restriction allows enough blue light to render the colors of objects illuminated by outdoor lighting reasonably well, yet protects Chilean citizens, wildlife and astronomical observatories from the detrimental effects of "too much blue."



Higher color temperatures mean bluer light, which negatively affects astronomical observations, human health and wildlife.

As Chile continues to be a major player in hosting international astronomy research facilities, its lighting policy is at the world's cutting edge protecting both dark skies above and life on the ground. Currently, the IDA Technical Committee is deliberating similar standards for our Fixture Seal of Approval Program. Stay tuned.

MORE ENERGY EFFICIENT LIGHTING, MORE LIGHT POLLUTION?

NASA photo of Berlin, Germany.

Disturbing Results from New Light Pollution Study

New technologies for outdoor lighting are resulting in greater efficiencies at lower costs spurring municipalities across the globe to swap out old lighting for new. Policymakers boast that lighting retrofits will lead to increased energy savings and reduced emissions of CO_2 and other greenhouse gases. But new research suggests that without responsible lighting policies in place, greater lighting efficiencies can actually lead to increased energy use.

The recently published study in the *Journal of Energy & Environmental Science* found that as lighting costs decrease, many users increase illumination levels and install lighting in previously unlit areas.

The research was conducted by IDA Board Member Christopher Kyba and scientists from the Berlin-based Leibniz-Institute of Freshwater Ecology and Inland Fisheries and the Museum am Schölerberg in Osnabrück, Germany.

The authors attribute their findings to the "rebound effect," which is when technological innovations increasing efficiency lead to greater consumption rather than reduced energy use.

They suggest implementing outdoor lighting polices that aim to lower CO_2 emissions and reduce energy consumption, and offer three policy recommendations:

- **Transition to need-based lighting**. Only light when and where it's needed. According to study author Franz Hölker, "By directing light more carefully, visibility could actually be improved while saving energy and money. In suburban and rural locations with very little activity after midnight, modern lamps could also be dimmed to 10 percent of their normal power until morning traffic begins."

- **Create maximum limit standards on illumination levels**. Lighting policies often focus on standards for minimum illumination levels while disregarding standards for maximum limits. In the U.S. and Europe, often the amount of light far exceeds current minimum standards. According to Hölker, "If you use twice as much light as is needed for a task, then half the energy is wasted."

- **Adopt new definitions of efficiency for urban lighting**. "We need a more appropriate measure for reporting energy efficiency, that would allow apples-to-apples comparisons of radically different lighting delivery systems," Kyba explained. "For example, suburban streets with lights that are dimmed after midnight could potentially use less energy in a year than a more efficient lamp that burns at full power all night."

According to the authors, the goal of lighting polices should be to provide the right amount of light needed while minimizing energy consumption and negative impacts on wildlife and human health. They conclude that implementation of these recommendations will result in real reductions in energy use without compromising the public experience and use of outdoor lighting.

SHEDDING LIGHT

Photo by Timothy Tsui

UK Study Finds Local Governments Can Do More to Fight Light Pollution

New research conducted by the Campaign to Protect Rural England finds that less than two thirds of local authorities in England are addressing light pollution in their lighting plans, despite changes to a national planning policy advising them to do so.

The CPRE has long been interested in addressing light pollution as part of their fight to protect the rual countryside. In 2003, they published a map of light pollution in the U.K. and conducted a short survey for their *Night Blight* report. In 2009, they published the *Lighting Nuisance Survey*, about light pollution's affect on people's day-to-day lives.

Their recent report is based on a comprehensive survey of local authorities on how outdoor lighting is addressed in their jurisdictions. Results from the 2014 study, based on 83 respondents out of 351 surveyed, are highlighted in the recently published report *Shedding Light – a survey of local authority approaches to lighting in England*.

According to the report, street lighting in England costs local authorities approximately £616 million per year and can account for up to 30 percent of their carbon emissions. Addressing light pollution not only helps preserve the nighttime environment, it addresses these important issues as well.

Lighting reduction policies have become increasingly popular in England including part-night lighting schemes such as dimming and switching off streetlights after dark, usually midnight to 5 a.m. The study found that streetlight dimming schemes were far more popular with the public than switch-offs.

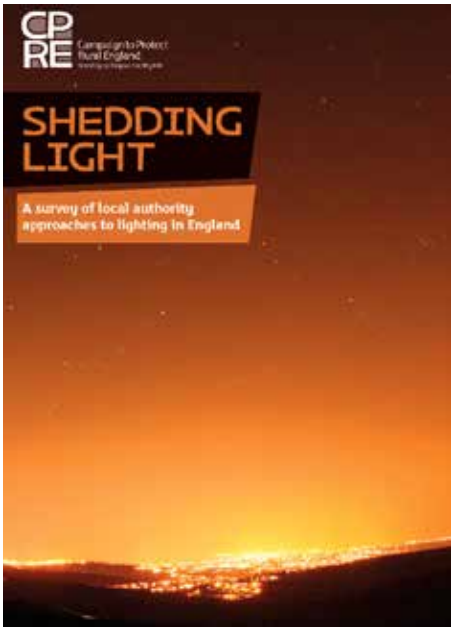
Of the local authorities implementing streetlight switch-off schemes, none reported crime had increased in those areas. Instead, they reported that crime had slightly decreased. However, the report emphasized that the "fear of crime" is an important issue to address and urged local authorities to consult their communities before implementing switch-off schemes.

The number one reason local authorities implement light reduction policies is energy savings with cost savings coming in close second, according to the report. Although local authorities see light pollution reduction as a welcome side effect of these policies, they rarely treated it as a main consideration.

The report acknowledged that many local authorities are taking positive steps to manage lighting more effectively, but emphasized that much more can be done including:

- Instituting light pollution control policies that include protection of existing dark areas,
- Investigating the use of part-night lighting schemes in consultation with local communities,
- Closely monitoring crime and accident statistics when part-time lighting schemes are implemented,
- Giving careful consideration to the types of light-emitting diode (LED) lighting used including potential negative effects of using higher temperature blue-rich lighting, and
- Having a "strong presumption against new lighting in existing dark areas."

The full *Shedding Light* report is available for free download at http://bit.ly/1lVlAB1.



ALAN RETURNS IN SEPTEMBER

The annual Artificial Light at Night conference is a global interdisciplinary event addressing the full range of light pollution issues. IDA is helping organize the three-day event along with the EU COST Action LoNNe (Loss of the Night Network). Hosted by the Leicester De Montfort Law School at De Montfort University, ALAN2014 will be held September 2-4 in Leicester, UK.

Building on the success of the first ALAN conference held in Berlin last October, the interdisciplinary event will consist of both plenary speakers and streams focusing on the following major themes: Biology and Ecology, Measurement and Modeling, Society, Technology and Design and Health. Confirmed invited speakers include Liisa Halonen, Christian Cajochen, Laura Fonken, Kevin Gaston, Nancy Clanton, Tim Edensor and Kim Baugh.

The conference should be of interest to scientific, social science and legal academics, as well as regulators and lighting professionals. For information about registration and lodging, visit the conference website at http://bit.ly/1jS7trq.

Photo by Jim Richardson

IDA WELCOMES 5 NEW INTERNATIONAL DARK-SKY PLACES

IDA welcomed five new locations into the Dark Sky Places family earlier this year, bringing the total of Communities, Parks and Reserves designated since the program's inception in 2001 to 30. From the charms of the Texas Hill Country to a quiet German oasis just outside Berlin, the new Dark Sky Places offer something for everyone. Together, they represent 5,400 square kilometers (2,085 square miles) of territory with protected dark skies.

Dripping Springs International Dark Sky Community

The stars at night remain famously big and bright deep in the heart of the Texas – thanks to the hard work and dedication of Texas Hill Country residents. In February, IDA named Dripping Springs the first International Dark Sky Community in Texas.

Dripping Springs bills itself as the "Gateway To The Hill Country" and is often the first Hill Country stop for visitors coming from the east. "When people enter the Dripping Springs area at night, many of them notice something is different – the skies over the city are not spoiled by light pollution," explained Todd Purcell, Mayor of Dripping Springs. "This is evidence that the city and the people who live in and near the city value the natural environment, including the beauty of the Hill Country and high quality of the night sky."

The city has seen explosive growth in the past decade fueled by the economies of the nearby urban centers of Austin and San Antonio. Alarmed that future development could bring light pollution, concerned residents organized to protect the area's famously dark night skies. Early on, the City Council became involved by adopting an Outdoor Lighting Ordinance (OLO) in 2000.

The success of the effort to bring Dripping Springs into the IDSP family is largely due to IDA Texas president Cindy Luongo Cassidy, who gives much of the credit to the city itself. "We are all fortunate that the City of Dripping Springs has over a period of many years worked to reduce and prevent additional light pollution," Cassidy said.

Dripping Springs plans to host the "Better Lights for Better Nights" symposium in August and the Texas Night Sky Festival in March 2015.

Parashant International Night Sky Province

In March, IDA announced the designation of the first International Dark Sky Park in Arizona and the first Dark Sky Place to be jointly managed by the U.S. National Park Service and the Bureau of Land Management. Grand Canyon-Parashant National Monument consists of a little over one million acres of some of the most remote, undeveloped land in the lower 48 states. Its nearest significant source of light pollution is Las Vegas some 60 miles (100 km) beyond the Monument's western boundary.

Parashant is a land of no paved roads, limited structures, four designated Wilderness areas and pristine night skies. "Solitude and wilderness have always been associated with Parashant and these characteristics exemplify our night skies," explained Eathan McIntyre, Physical Science Specialist at Parashant and leader of the effort to secure the IDA designation

NPS Director Jonathan Jarvis characterized the IDA designation as the result of a "beautiful partnership" with the BLM. He hopes IDA's recognition of Parashant will attract other BLM sites on the Colorado Plateau to educate communities and protect night skies. "The night sky is something you can restore. It's not gone, it's still there and all we have to do is pay attention to our lighting," Jarvis said.

IDA's recognition of the primeval darkness over the Parashant attracted the attention and praise of the Monument's neighbors, the Kaibab Band of the Paiute Indians. Manuel M. Savala, chairperson of the Kaibab Paiute, explained why dark skies are significant to his tribe's members. "Any effort that can help conserve our dark night skies and to protect a place where one can clearly look toward the stars and planets will benefit our younger generations, our visitors, and the tribal community at large."

Blue Ridge Observatory and Star Park International Dark Sky Park

Among the new class of Dark Sky Places is the first Dark Sky Park managed by an institution of higher learning. Blue Ridge Observatory and Star Park is situated six miles west of Spruce Pine, North Carolina, in the Blue Ridge Mountains. The six-acre (2.4-hectare) site, surrounded by rugged mountain terrain and the Pisgah National Forest, is owned by Yancey County (NC) and managed by Mayland Community College. It shares the property with the EnergyXchange, a project that uses methane gas emitted by an old landfill to heat horticultural greenhouses and artists' studios.

In addition to being the first Dark Sky Park in the southeastern United States, it is the first with outdoor lighting consisting entirely of fully-shielded, low-color-temperature light-emitting diode (LED) fixtures. The Star Park management has summarized dark sky principles and provides clearly labeled replacement bulbs to help park staff properly maintain the fixtures.

Jon Wilmesherr, MCC Director of Learning Resources Center and Distance Education who led the effort to secure the IDA award, is optimistic that the Star Park will serve as a model for land management by colleges and universities. "I hope other educational institutions will consider the benefits of sponsoring an IDA star park, where the demonstration

Backyard camping in Dripping Springs, Texas. Photo by Rob Greebon.

A Quonset hut used as an artist studio at the EnergyXchange. Photo by Todd Bush.

of lighting conservation can lead visitors to a better understanding of the urgent need for the preservation of the natural night sky," he said.

MCC plans to build an observatory on the property featuring a state-of-the-art 34-inch (0.87- meter) telescope dedicated to educational and public outreach activities. Dr. John Boyd, President of MCC, anticipates significant benefits to the community by locating the telescope under the dark skies at Blue Ridge Observatory and Star Park. "This entirely public observatory will offer evening and late night viewing through the largest public telescope in the Southeast," he explained. "Our observing programs will provide an interesting, affordable and educational family outing for the people of western North Carolina and the region."

Westhavelland International Dark Sky Reserve

The world's newest International Dark Sky Reserve is located in a surprising place – only 45 miles (70 km) west of Berlin, the most populous city in Germany. Due to Westhavelland Nature Park's sparse population and protected status, experiencing a dark night sky is within easy reach of nearly six million people. The new Reserve consists of 290 square miles (750 square kilometers) of public and private land.

Westhavelland is closer to a major population center than any other Dark Sky Reserve, making its achievement all the more significant. Organizers confronted the reality of the underdeveloped infrastructure in the former East Germany, convincing municipalities to keep their lights low.

"Even though the communities in the Nature Park struggle with implementation challenges, they join us in the vision that dark nights are precious and worthy of protection," said Park Superintendent Kordula Isermann. "That is especially significant because it takes guts to stand up for a dark night sky in Eastern Germany."

Dr. Andreas Hänel, director of the planetarium at the Museum Am Schölerberg in nearby Osnabrück, led the effort to secure the IDA designation.

"I hope that this designation will be a motivation for the communities in the Nature Park and many more in the country to install sustainable, environmentally friendly lighting in the future to protect the night and the starry sky," Hänel said.

> "The implementation of a dark-sky protection area in densely-populated parts of Europe is challenging"

Eifel International Dark Sky Park

IDA has provisionally granted Dark Sky Park status to Eifel National Park, the first and only German National Park in the Federal State of North Rhine-Westphalia. Eifel is also one of the youngest in the German National Park system, created in 2004. It covers 110 square kilometers (42 square miles) of territory in west-central Germany near and along the Belgian border.

Promotion of the dark night skies over Eifel adds a new dimension to recreation activities at the Park. Its history extends back more than 70 years when the region was chosen for the site of Ordensburg Vogelsang, an estate developed for the education of selected Nazi party officials.

The 250-acre (100 hectares) complex was built in 1934-36. In 1950, the Belgian Armed Forces took over the site, known as "Camp Vogelsang" until 2005. It is now operated as the "vogelsang ip International Place in Eifel National Park." More than 200,000 visitors a year now enjoy leisure and educational activities including nighttime stargazing, nocturnal bat observing and ranger-led night walks.

Eifel National Park is situated in one of the most densely populated parts of Western Europe. Nearly 20 million people live within two hours of Eifel by car or train. Despite the encroachment of modern urban development, the park is a dark sky oasis surrounded by a sea of light. The park's location near major population centers such as Aachen, Bonn, and Cologne presents a special challenge in preserving this fragile natural resource.

The effort to save Eifel's dark skies was led by Harald Bardenhagen, CEO of Astronomie-Werkstatt "Sterne ohne Grenzen," an astronomy education institution. Dubbed the "Star-Warrior of Cologne" by local media, Bardenhagen took on the monumental task of convincing dozens of communities in and around the park that placing restrictions on outdoor lighting would protect the park without threatening their safety and security.

"The implementation of a dark-sky protection area in densely-populated parts of Europe is challenging," Bardenhagen said. "For this task one does not only need spirit and enthusiasm to promote dark skies and the value of a nightscape without light pollution. One also needs to demonstrate the advantages of illumination alternatives to address the broad range of problems caused by artificial light at night such as energy waste, greenhouse gas emission, and potential harm to human health and biodiversity."

The Milky Way over Eifel National Park. Photo by Harald Bardenhagen.

SAVE OUR STARS KITS
ARE ON THE WAY!

LEFT: The new IDA SOS logo t-shirt.
ABOVE: SOS kits being assembled at IDA headquarters in Tucson for the inaugural class of participating amateur astronomy clubs.

In April, the first round of materials for the recently launched IDA Save Our Stars Program was shipped to 14 amateur astronomy clubs across the United States. The program aims to reengage the amateur astronomy community as allies in the fight against light pollution while providing new public outreach opportunities for astronomy clubs.

SOS events offers opportunities for city dwellers to get away from bright city lights, experience a star party and "see what they're missing." Within this context, participants learn about the negative effects of light pollution and how to advocate for dark skies. Each participating club receives a "kit" containing a flashlight and reflector for conducting a light shielding demonstration, printed materials on how to measure the brightness of the night sky, custom SOS logo t-shirts and pens, IDA brochures and other goodies. The kits and demonstrations are designed to be simple and easy to implement in order to effectively reach audiences across the globe.

SOS clubs test drove presentations during events scheduled in May and June. Through feedback on what works and what needs improvement, the contents of the "kits" will be refined to better meet clubs' needs. The program will expand to its first non-U.S. clubs about the time this issue of *Nightscape* lands in your mail or inbox. If your local astronomy club is interested in joining SOS, please contact Program Manager John Barentine at john@darksky.org. For more information about the program visit darksky.org/sos.

Dougherty speaking with IDA members in Melbourne, Australia, about organizing a new chapter. From left to right: Dr. Barry Clark, Nick Lomb, Annalea Beattie, Jim Dougherty and Tony Wolfe.

IDA BOARD PRESIDENT'S TOUR
NETS NEW FRIENDS AND MEMBERS

Elected in November, new IDA Board President Jim Dougherty hit the ground running traveling in March to Hawaii, Australia and New Zealand to meet with members, chapter leaders and local light pollution activists.

His first stop landed him in Turramurra, Australia, where he met up with local advocates and Reg Wilson, head of the IDA Asia Pacific Office. In Melbourne and Sydney, Dougherty gave presentations and met with IDA members and dark sky enthusiasts interested in starting IDA chapters. He then ventured to Christchurch, New Zealand, and met with more IDA members and John Hearnshaw, the chief architect of the Aoraki/McKenzie Dark Sky Reserve.

From New Zealand, Dougherty touched down in O'ahu, Hawaii, and convened with dark sky advocates Ron Laub and University of Hawaii astronomy professor Richard Wainscoat to discuss Hawaii's growing problems with light pollution and enforcement. On the Island of Hawai'i in Hilo, Dougherty spoke with Ron Thiel, manager of the island's street lighting system, who is working to strengthen the island's lighting ordinance, which is up for renewal.

"I was struck by how passionate our members' commitment to our mission is," Dougherty explained. "Moreover, so many of them want to get involved in the work."

Dougherty said that he is excited about doing more to engage "this reservoir of talented believers" nationally and internationally "so we can all work in concert to fight for dark skies."

TWO DARK SKY RESERVES, TWO HEMISPHERES, ONE FRIENDSHIP

BY MARTINA MCAULEY
of Earth and Sky Ltd. in Tekapo New Zealand

Earth and Sky Observatory, home of the Aoraki Mackenzie International Dark Sky Reserve (IDSR), is developing a valuable connection with the Kerry IDSR in Ireland. The idea of establishing this link was born of the fact that Ireland and New Zealand are two dark sky reserves with Gold-tier status in opposite hemispheres. This is a unique opportunity to forge a relationship not only between the two Gold-tier locations but also between the two countries.

To add a more formal link between the two sites, Earth and Sky have sent Kerry a gift to mark the prestige of their Gold-tier award. "The gift is an original piece and exemplifies the sort of celebration trophies currently made in New Zealand. It represents the achievements of the organization so far, and we wanted to send the same kind of trophy to Kerry IDSR," explained Margaret Munro, General Manager of Earth and Sky.

The gift's Gaelic wording means "Two Dark Sky Reserves Protecting Our Dark Skies Together." "It is significant to have that tie back to the native tongue as it would be in New Zealand with the Maori, in respect of our forefathers," Munro added. The stars represent the Southern Cross, something unique to the Southern sky and the edging depicts the Southern Alps.

"Having the connection between two Gold-tier reserves in the Northern and the Southern Hemispheres is invaluable," Munro said. "The amount of traffic that's now travelling globally between the two hemispheres is huge. That link will mean that tourists who have been to our dark sky reserve can see where the equivalent is in the Northern Hemisphere. It will enable them to seek out another area that's perfect for stargazing."

In January 2014, IDA designated Kerry IDSR as Ireland's first International Dark Sky Reserve. This means that on clear nights, many astronomical sights can be seen with the naked eye in the southwest region of Ireland such as Ursa Major and Minor, and star clusters of Perseus and Cygnus. Areas from Kells to Ballinskelligs offer many great stargazing spots.

"In the core zone of the reserve, there's a listed house, a stone fort and hundreds of prehistoric rock art pieces. One can rent a house there inside the core zone, have a cup of coffee or a pint and sit outside to view the stars," said Julie Ormonde, Project Manager of Kerry Dark Sky Reserve.

A gift from Earth and Sky Observatory, home of the Aoraki Mackenzie International Dark Sky Reserve, to the Kerry Dark Sky Reserve in Ireland.

Aoraki Mackenzie IDSR was awarded a Gold-tier status in June 2012. Comprised of Aoraki Mt. Cook National Park and the Mackenzie Basin and covering an area of 4,367 square kilometers, it is the largest Dark Sky Reserve in the world.

Outdoor lighting controls were put in place here in the early 1980s. They not only help to minimize light pollution but also to conserve energy, protect wildlife and make the area a popular stargazing destination for tourists.

The night sky has played a critical role in the area's history. Its first residents, the Maori, used the night sky not only to navigate to the island but also integrated astronomy and star lore into their culture and daily lives. Much like the Maoris, the Neolithic inhabitants of the Iveragh Peninsula in Kerry used the night skies in their own way, too. They built standing stones to map and measure the alignments of the solar and lunar cycles.

Ormonde believes the effort to establish a link between the two locations is worthwhile. "The two areas can work together to promote astronomy as a hobby, as a science and as an exciting dimension to our lives, a dimension that's fading because of light pollution," she said.

Munro agrees. "Here at Earth and Sky we wish Kerry IDSR all the best for its success and hope that it certainly gets the global recognition the Aoraki Mackenzie IDSR got when it was given Gold-tier status."

JOIN US FOR AN EXCITING DARK SKIES CONFERENCE IN AUGUST

Join IDA at *Blinded by the Light: A Summit and Call to Action to Protect our Night Skies*. The three-day, IDA-sponsored event is being held August 18-20, in Flagstaff, Ariz.

Summit Goals:

- Shed light on the value of dark skies and existing and emerging tools and technologies supporting those values,
- Address issues of safety, cost and lighting standards,
- Spark demand for dark sky lighting technologies, and
- Develop a framework and commitment to collective action across the Southwest and a network of dark skies resources to help meet the challenge.

The event is geared for a broad set of participants including city officials, scientists, lighting specialists, developers and community leaders and activists. For more information, go to www.keystone.org/darkskies.

INTERNATIONAL
DARK SKY
WEEK
DAILY THEMES

DAY 1
LIGHT POLLUTION MATTERS

DAY 2
ILL HEALTH

DAY 3
THE ENVIRONMENT

DAY 4
ENERGY WASTE

DAY 5
LIGHTING, CRIME & SAFETY

DAY 6
STARS ARE OUR HERITAGE

DAY 7
TAKE ACTION!

INTERNATIONAL DARK SKY WEEK 2014 WAS A GREAT SUCCESS!

Did you celebrate International Dark Sky Week in April? If so, you weren't alone. IDA used social media to reach tens of thousands of people with our message and made new friends and contacts around the globe. This year we promoted a different theme each day and pointed folks to our newly created, theme-based webpages (see sidebar).

The content-rich pages have since been revised and are now a permanent addition to the IDA website. To explore the pages, go to "Light Pollution Topics" on the IDA Resources page.

IDA received a lot of great national and international media coverage and large boosts in social media reach and website traffic.

Media Coverage Highlights

Media coverage highlights include *BBC News, Huffington Post, Slate* magazine, the very popular *Bad Astronomy* blog and *EarthSky News*. Much of this coverage was widely distributed through social media, as well.

Social Media Reach

IDA's Facebook page saw big boosts in traffic regarding the numbers of likes, comments, shares and post clicks throughout the week. We reached approximately four times as many people than any week during the last quarter - about 300,000 people total. This is due in part to nearly 400 shares of our posts each day, about ten times the number in a typical week. Several time-lapse photographers who promoted the week and IDA through their videos also contacted us through Facebook.

On Twitter, we made use of a Twitter hashtag to track mentions of Dark Sky Week (#IDSW2014). The hashtag helped Twitter users follow the conversation, and provided us with useful information about the success of the campaign. Twitter users tagged posts about all aspects of light pollution and dark skies, and drove readers to our website for more information.

IDA Web Traffic

Our website saw significantly higher traffic than usual, with over 20,000 unique page views during the week. Nearly four out of five visitors were new to the site, coming to us from 90 percent of all countries in the world.

Across both social media and our website, we found that Day 5 (Lighting, Crime & Safety) resulted in the highest number of unique page views, Facebook likes, and Twitter mentions and retweets. Users also highly rated Day 2 (Ill Health) and Day 4 (Energy Waste) with their page views and social media engagement.

"Losing the Dark" PSA

Our 6.5 minute PSA on light pollution was viewed on Vimeo or YouTube more than 1,500 times during the week, 2-3 times higher than the average. We pushed the video through social media at the beginning and end of the week, and it was also promoted by Space.com.

A big shout out to all those who wrote, tweeted, and posted about IDSW, IDA and the issues surrounding light pollution. Thank You! And a special thanks to photographer Jonathan Danforth for generously donating 50 percent of all proceeds from the sale of his night sky photography during the week.

In short, we find that IDSW continues to be one of our most important annual awareness campaigns and, for the first time, we have some reliable figures on exactly how many people worldwide heard our message. Next year, IDSW will be celebrated from April 13-18 and will incorporate themes from the International Year of Light.

IDA TAKES DARK SKY MESSAGE ON THE ROAD

It has been a busy spring at IDA as staff took the dark sky message on the road to a wide variety of events in North America and Europe.

More than 200,000 people attended this year's Light+Building trade show in Frankfurt, Germany and IDA was there to spread the word. Held every two years, the exhibition is the world's largest trade show for new lighting and energy efficient products. Outdoor lighting controls were all the rage at this year's show, proving that dimming and motion sensing technologies are here to stay.

It is particularly encouraging that the vast majority of lighting products were offered with correlated color temperatures (CCTs) below 3500K. This marks a huge change from the high CCT, blue-rich lighting choices that dominated the scene only a few years ago when LEDs first hit the market. Concerns about the new high color temperature lighting prompted IDA to put out our white paper on blue-rich light four years ago. We will soon be announcing new criteria for our Fixture Seal of Approval program that lowers the amount of blue light allowed for approved fixtures.

IDA also exhibited and presented at the 34th International Symposium on Sea Turtle Biology and Conservation in New Orleans. As the most well-known species affected by light pollution, sea turtles are the "poster child" for problems due to light at night. Nonetheless, IDA gave one of only two presentations on light pollution during the four-day conference, even though most sea turtle biologists and conservationists are well aware of issues related to lighting on or near sea turtle nesting beaches.

IDA's talk focused on our findings from our Florida sea turtle habitat restoration work. There were also a handful of light pollution-related poster papers and the Sea Turtle Conservancy showed off their traveling exhibit on turtles and outdoor lighting. It was a great opportunity for IDA to network and gain further traction within the environmental community – an area where we hope to greatly expand our influence regarding light pollution issues.

IDA's Matt Root spreading the word about the FSA program at LIGHTFAIR 2014.

In May IDA presented to city planners at the British Columbia Land Summit in Vancouver, Canada. The talk introduced the many implications and wasted resources resulting from bad outdoor lighting. The opportunities and challenges that communities face as they consider changing their lighting to LEDs were also discussed along with the importance of proper shielding, low color temperatures, dimming and motion controls. A big "Thank You" to Cdm2 Lightworks for their generous support in helping bring IDA to the BC Land Summit.

This spring IDA attended several astronomy-themed events, as well. In April, IDA staff exhibited and presented at the annual Northeast Astronomy Forum in New York. It was a great opportunity to visit with some of our members from the amateur astronomy community and to meet and sign up new members. The most popular item at the IDA booth was the new Save Our Stars (see story on page 12) t-shirts that were sold during the event.

The First Annual StarLight Festival organized by IDA Board Member Scott Roberts was a great success. The family-friendly event held in May in Big Bear, Calif., included music and the arts and aimed to create a better understanding of science and astronomy through interactive outreach and hands on experiences. IDA's Scott Kardel shared IDA's mission at the Festival's STEM Zone where attendees learned about protecting our night skies. For many attendees, it was their first experience hearing about light pollution and IDA.

As this issue was going to press, IDA was also present at LIGHTFAIR International promoting our Fixture Seal of Approval program.

Orlando Science Center exhibiting at the Dark Sky festival in Harmony. Photo credit: VMA Studios.

CHAPTER NEWS

IDA Australia

Reg Wilson of IDA Australia and head of the IDA Asia Pacific Office reports that real progress being made on Australian and New Zealand lighting standards. Meetings held at a recent field trip to the Siding Spring Observatory (SSO) gave the more than 25 members of the Standards Committee for Lighting for Roads and Public Spaces a better understanding of the problems caused by light pollution. "The best way I can describe the benefit of this event is that it was like opening the blinds in a dark room on a sunny day," Wilson said.

Standards Committee members come from all Australian States and Territories and New Zealand. The trip involved a detailed tour of SSO and the opportunity to interact with astronomers resulting in a new appreciation of light pollution issues affecting astronomy. At the same time, the astronomers gained a new understanding of outdoor lighting issues confronting the Committee. In the evening, the group looked at new dark sky friendly sports lighting followed by night sky viewing with telescopes operated by the local astronomy club. Committee members came away with a better understanding of why light pollution is an important issue.

IDA Central Florida

IDA Central Florida again helped organize the Annual Dark Sky Festival in Harmony, Fla. Harmony was the first Dark Sky Development of Distinction recognized by IDA and has hosted the festival each year to call attention to the values of dark skies and to foster an interest in science through a fun outdoor event. The festival was a great success attracting 9,000 visitors.

IDA Mexico

Fernando Avila-Castro of IDA Mexico reports that the cities of Ensenada and Mexicali have approved the formation of a technical committee to regulate public lighting in both cities. This is good news for the National Astronomical Observatory (NAO) at San Pedro Mártir near Ensenada, Baja California, which still enjoys relatively dark skies. It is also good news for observatories in Southern California such as the Mount Laguna Observatory, which is affected by Mexicali's sky glow. The topic of light pollution and protection of the NAO has been getting some positive press, a sign that good things are happening.

IDA Pennsylvania

IDA's Pennsylvania Chapter, the Pennsylvania Outdoor Lighting Council, has been keeping busy. Its numerous efforts to spread the word about light pollution included a presentation on enacting and enforcing an effective lighting ordinance at the annual conference of the Pennsylvania State Association of Township Supervisors, in Hershey, Pa. The chapter also manned a display table at the annual conference of the Pennsylvania Association of Township Supervisors held in Reading, Pa. Be sure to check out their website, which is updated often at www.polcouncil.org.

IDA Phoenix

On February 8, Gene Fioretti of IDA Phoenix, along with IDA staffer John Barentine exhibited at the 2014 Buckeye SciTech Festival. The event is reported to have drawn over 25,000 people. The two spent the day explaining and vividly demonstrating the problems of light pollution to the many people who stopped by the booth. Woodland Hills Telescopes donated a Celestron 80mm refractor telescope as a raffle prize that was given away at the event.

New Chapters

IDA welcomes two new chapters in Canada. Jennifer Howse is heading up the new chapter in Calgary, Canada. The chapter brings together people from various groups including the Royal Astronomical Society of Canada, the local government and the Rothney Astrophysical Observatory, which is serving as chapter headquarters.

IDA Toronto, headed by Anju Noyes, is also starting off with a diverse core membership and includes members from the fields of architecture, engineering, lighting, astronomy and more.

There has been a tremendous interest in combatting light pollution in Republic of Korea (South Korea) leading to the formation of new IDA chapters there. Professor Jeong Tai Kim is heading up the new IDA Korea. He is the Director for the Center for Sustainable Healthy Buildings and in the Department of Architectural Engineering at Kyung Hee University. Won-Kil Jeong is leading the new chapter in Gyeonsan City, a group that has active participation from the local government and is interested in establishing the first International Dark Sky Place in Korea.

The Dark Sky Preserve — 5816 Road 506
(44.91791, -76.93947)
south of Plevna, Ontario.

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The Dark Sky Preserve is a public space with ammenities, including parking, washroom, electrical service and the concrete pad, where anyone can set up their telescope and enjoy the dark skies.

North Frontenac Township
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For more information about the Dark Sky Preserve call 1-800-234-3953 or visit NorthFrontenac.com

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