Artificial light at night (ALAN) is associated with a sense of security, wealth and modernity. Hence, artificial light has become an irreplaceable aid for human activities after the onset of darkness. As a consequence, the illumination of the nightscape has increased in its intensity, time and space. There is a growing community concerned about this increasing illumination of natural nightscapes, because of escalating negative effects on biodiversity, nightlife habitats, visibility of stars and astronomical phenomena as well as on human wellbeing. Measures to reduce the negative impacts of outdoor lighting are easy of obtain, but need the awareness and activism of the community. Raising awareness of the impacts and providing simple measures to reduce them, will not only benefit nature and the general public, but also help to save energy and taxpayer money.
STARS4ALL ambition is to involve as many community actors as possible in the fight against light pollution. For that purpose, STARS4ALL has deployed an online platform (http://www.stars4all.eu) to provide citizens, scientists and a wide range of stakeholders with the tools and support required to incubate and create local or global working groups (Light Pollution Initiatives - LPIs), with different domain-specific purposes (e.g. preserving clean skies for Astronomy, reducing Energy consumption, ensuring Biodiversity, improving Human Health).

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far

Procedures have been initiated for creating the STARS4ALL foundation in Spain, after an analysis of pros and cons of its creation in different EU member states. Foundational members (incl. individuals from outside STARS4ALL) signed its statutes and made personal monetary contributions. The foundation is pending official approval.

Two tools are in place to support the foundation: a marketplace (which will not only commercialise our own products, but also items related with STARS4ALL initiatives) and a crowdfunding tool (based on the white label solution mipise). Both will allow raising funds for the project and for the LPIs run under the supervision of the STARS4ALL foundation.

The low cost open-hardware photometer TESS has been created. TESS monitors the night sky brightness from fixed stations using a WIFI module for communication. The 42-photometer network is operational, data are sent to the STARS4ALL data platform (ckan.stars4all.eu) and monthly datasets with their corresponding DOIs are preserved in a Zenodo Community (https://zenodo.org/communities/stars4all/) so that they can be used and cited by the research community. An API and several web components have been developed to visualize all this data.

A game (Night Knights - www.nightknights.eu) has been developed and tested. This game complements activities carried out by the Dark Skies ISS app. In June 2017, 912 users had solved 30000 tasks.

Light Pollution Initiatives (LPIs) are the means by which citizens can participate in the project. An initial set of 14 LPIs were setup during Y1, exceeding the initial set of 10 LPIs promised in the description of work, and 10 new LPIs were incorporated in Y2. LPIs are supported by a set of tools so as to coordinate actions within their communities. STARS4ALL offers web hosting in our servers (from a simple page to a Wordpress instance, such us the one used for Cities At Night - www.citiesatnight.org) data hosting (ckan.stars4all.eu). LPIs can include in their webpages web components like forums, blogs and rating components to facilitate the communication with their community.

Three public competitions have been launched for community engagement: 1) promotion of the Cities At Night LPI, with the incentive of travelling to the STARS4ALL expedition to Iceland; 2) incorporating 10 new LPIs; 3) participation in two STARS4ALL apps (Night Knights, Cazasteroides), with the incentive of travelling to the STARS4ALL expedition to the USA.
The project is promoted through popular social networks (Facebook, Twitter, Youtube, Flickr), through the broadcasting of Astronomical phenomena, and being present in conferences, publications (papers & magazines), TV, radio, schools, etc. Some remarkable events: the Earth Hour (stars4all.eu/index.php/stars4all-at-earth-hour-with-wwf-spain/) in collaboration with WWF Spain, the Finde Científico (stars4all.eu/index.php/scientific-weekend/) in Madrid, or ITB Berlin (stars4all.eu/index.php/stars4all-itb/). Thanks to these activities, we continue to raise awareness among citizens, and we are also perceived as the main project that supports the early-stage light pollution community: taking up results from the LoNNe (Lost of the Night) network, helping in intercomparison campaigns, performing educational activities, collaborating with grassroots activists, etc.

At the legislation level, we have been working in two initiatives: the European Sky Protection Initiative (https://goo.gl/XBSQgQ) where we will make use of the European Citizen Initiative mechanism, and a Quality label (https://goo.gl/zmv4GL).

In summary, the project has achieved all the objectives setup for the first period (foundation, funding mechanisms, LPIs and tool support, data portal, photometer network, gaming application). No major delays have been accumulated and the work plan for the rest of the project is kept as originally proposed.

Progress beyond the state of the art and expected potential impact (including the socio-economic impact and the wider societal implications of the project so far)

STARS4ALL is especially focused on achieving impact in terms of innovation and digital society. Furthermore, although scientific impact in STARS4ALL is not a priority, we expect to have also relevant scientific advances to the state of the art in the different domains of the STARS4ALL multidisciplinary consortium (ICT, Social Sciences, Economy, Astronomy, Biodiversity).

Innovation:
1) STARS4ALL proposes a new participatory model based on open software/data/hardware. APIs have been developed to wrap most platform services (sensors, data, games). They allow creating their own software (e.g. games-with-a-purpose, web apps, dashboards) and hardware (e.g. new sensors like weather stations, pollution). We will integrate more APIs from our LPIs. Data will be accessible from our data platform.
2) STARS4ALL allows creating (aka incubating) working groups related with LPIs, with supporting tools and resources. The STARS4ALL foundation will aim at ensuring their financial support, with income from consulting services regarding light pollution, crowdfunding transactions fees, donations and service and product offers in the marketplace.
3) STARS4ALL is attracting the attention of activists from disciplines beyond Astronomy and Biodiversity, including tourism, education, urban planning and gaming.

Digital society:
1) STARS4ALL encourages a more active collaboration of all stakeholders, with citizens able to participate in all the steps of the light pollution awareness lifecycle (e.g. creating working groups (LPIs), taking decisions, adding information and data and participating in our citizen sensors network), and bringing together activist associations from different domains (Astronomy, biodiversity, energy, human health). The cooperation among stakeholders will bring social improvements by saving money to governments and therefore to citizens, environmental benefits in less emissions of CO2 and a better health of biodiversity, and better health also for citizens.

2) STARS4ALL encourages a stronger citizen participation in decision making and collective governance (e.g. by using the European Citizen Initiative mechanism).
Web component to visualize the magnitude value measured by a photometer

Light Pollution effects (credit: Reiner Stock)
**STARS4ALL**

**MEASUREMENTS**
- Photometer Network
- Virtual Night + Sky eye
- Loss of the Night
- My Sky At Night
- Intercomparison campaigns
- NixNox
- Globe At Night
- Macaronesia
- Dark sky meter

**ASTRONOMY & BEAUTY OF THE NIGHT**
- Star parks
- Broadcasting events
- Nocturnal darkness in Europe

**LIGHTS IN MY NEIGHBORHOOD**
- The beauty and the beast
- Cities At Night
- Façade Lighting
- Liquen - Octal

**EDUCATION & AWARENESS**
- Light Pollution Outreach
- STARShruQL
- Buiometria participativa
- Education on LP. Portugal & Spain

**MOVEMENTS FOR POLICIES**
- European Sky Protection
- Lighting Quality Label
- Empower Citizen Actions

LPI ecosystem

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