



Dark Sky Meter

International Year of Light 2015 Special Edition app

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@pruss

on behalf of Norbert Schmidt (DDQ, NL)

www.ddq.nl



INTERNATIONAL
YEAR OF LIGHT
2015

**COSMIC
LIGHT**



**Universiteit
Leiden**

The Netherlands



Dark Sky Meter

International Year of Light 2015 Special Edition app

The Dark Sky Meter app ***supports the understanding of our dark-skies*** and their preservation for future generations a central theme of the IYL2015 Cosmic Light Programme.

Unihedron

Sky Quality Meter


19.66

mags
arcsec²

Start



www.unihedron.com



DSM IYL 2015

DARK SKY METER

LIGHT2015 EDITION



INTERNATIONAL
YEAR OF LIGHT
2015

COSMIC
LIGHT 

DARK SKY METER

STEP 1

Cover camera
and press 1

1
DARK



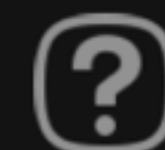
Meter



Map

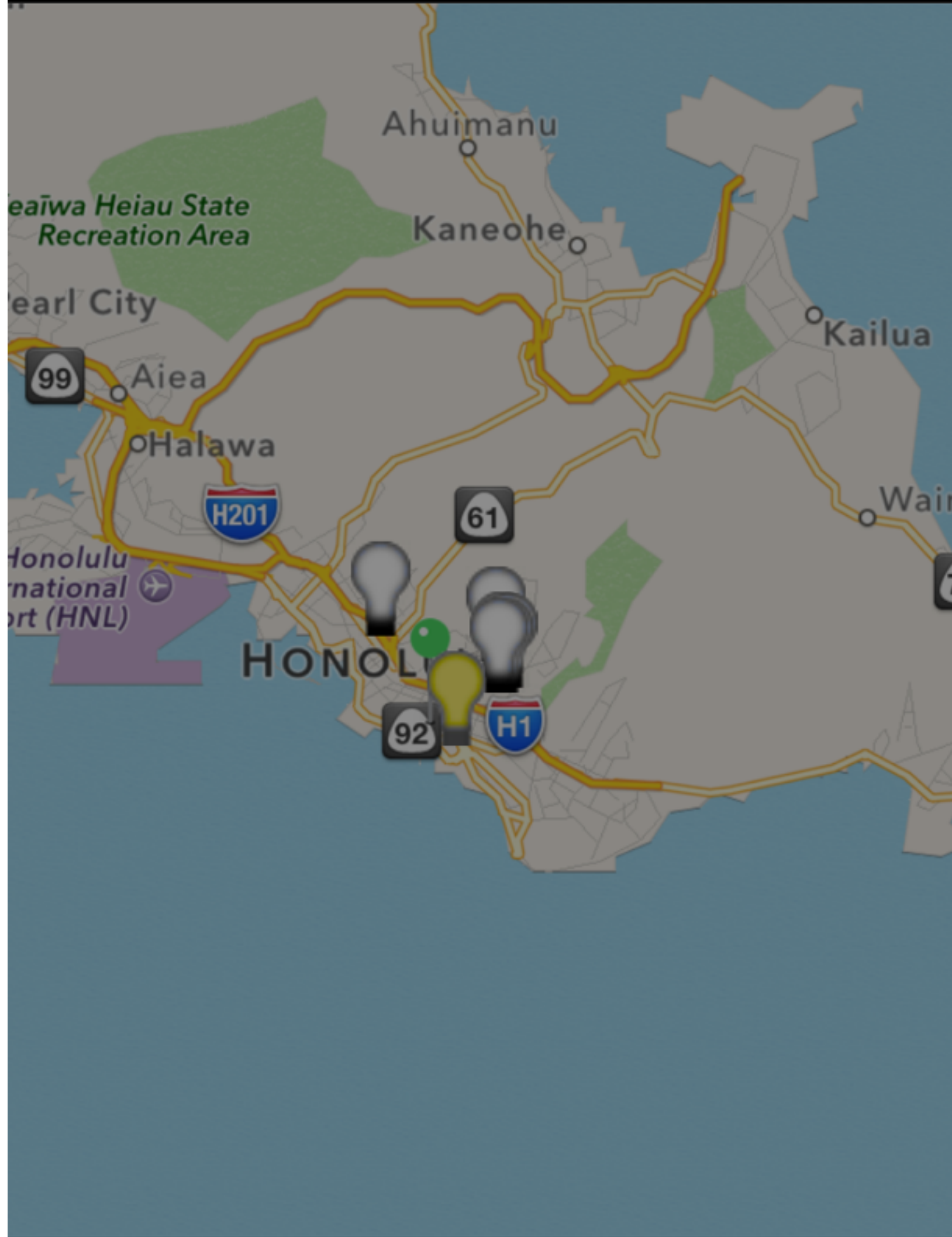


IYL 15



Help

MAP



City Bright Suburban Rural Dark



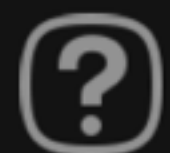
Meter



Map

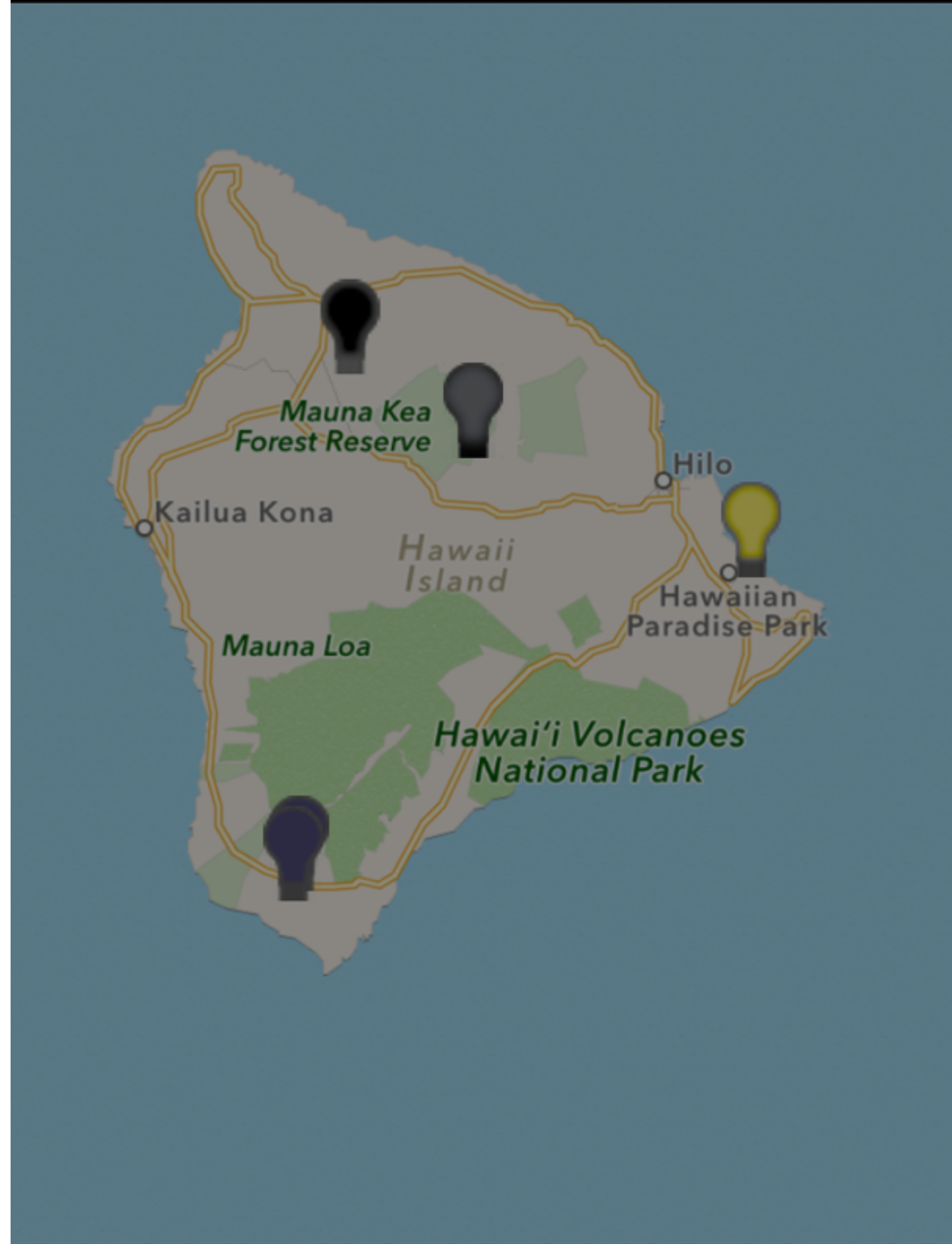


IYL 15



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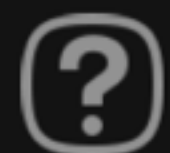
Meter



Map



IYL 15



Help

MAP



City Bright Suburban Rural Dark



Meter



Map



IYL 15

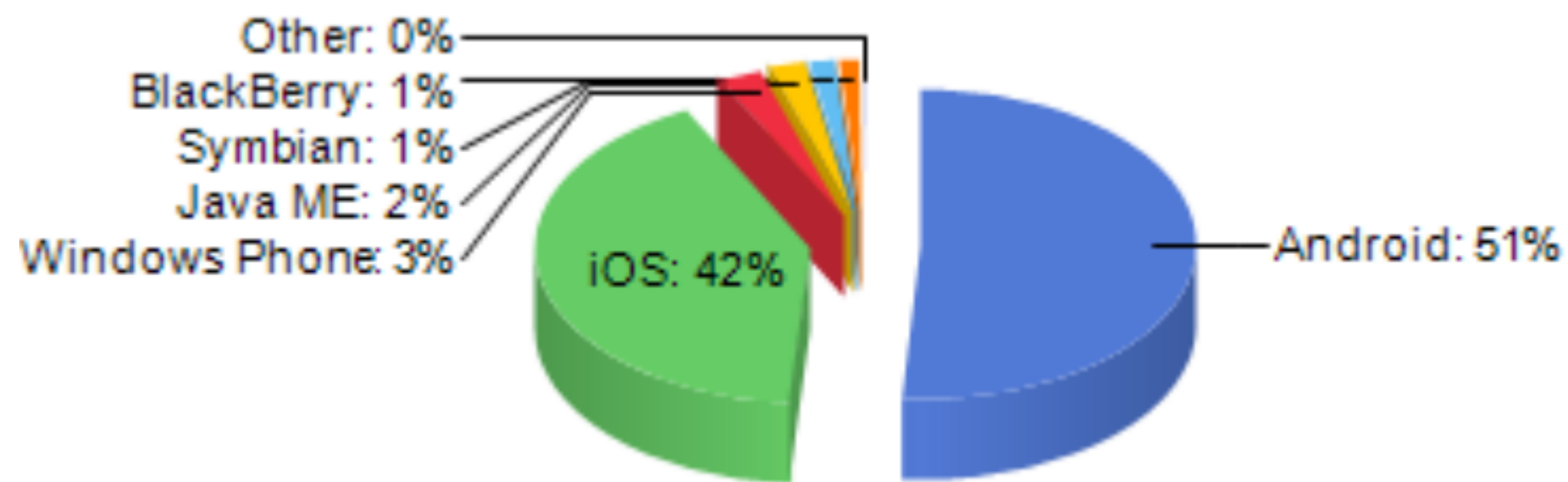


Help

iPhone only?

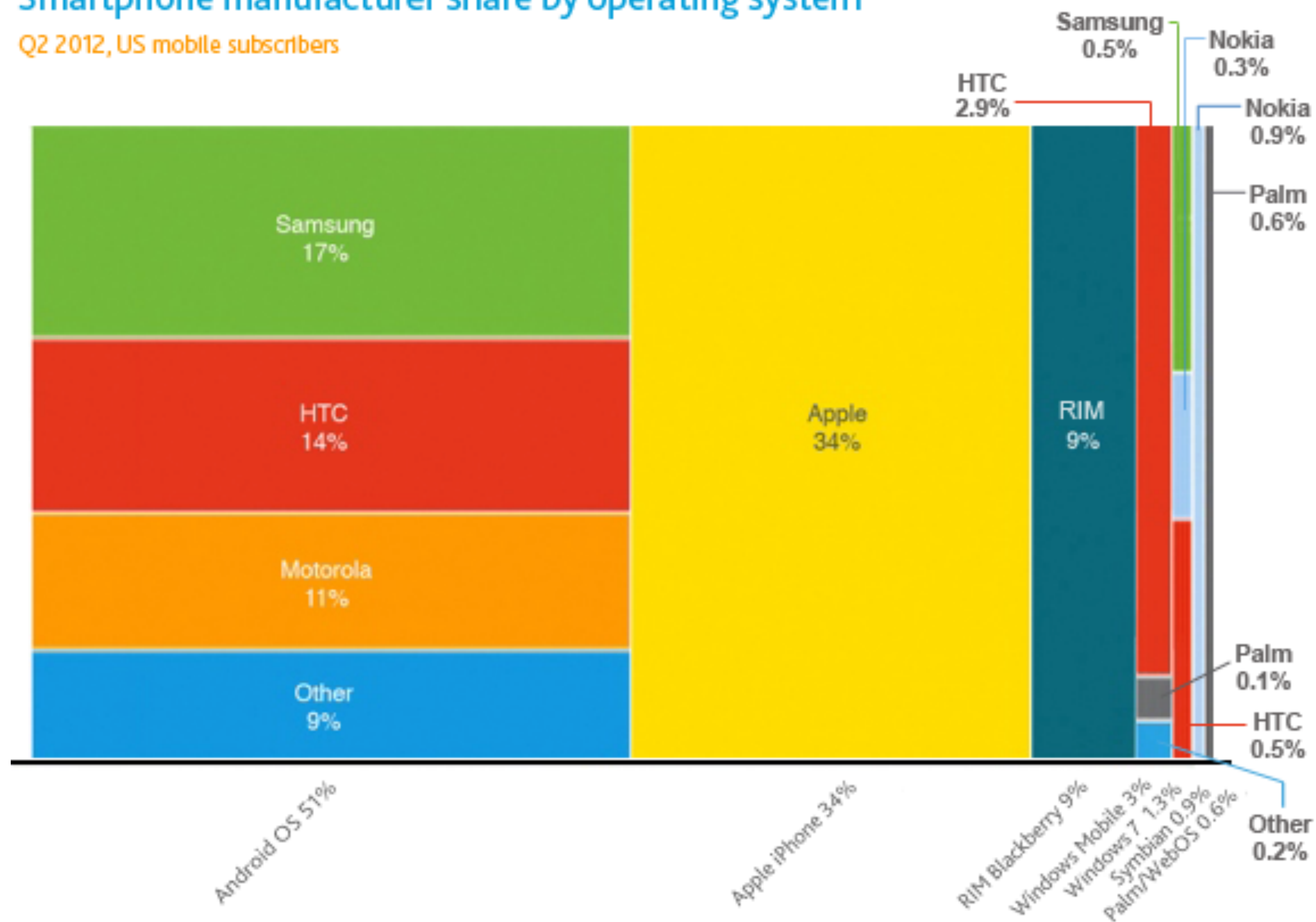


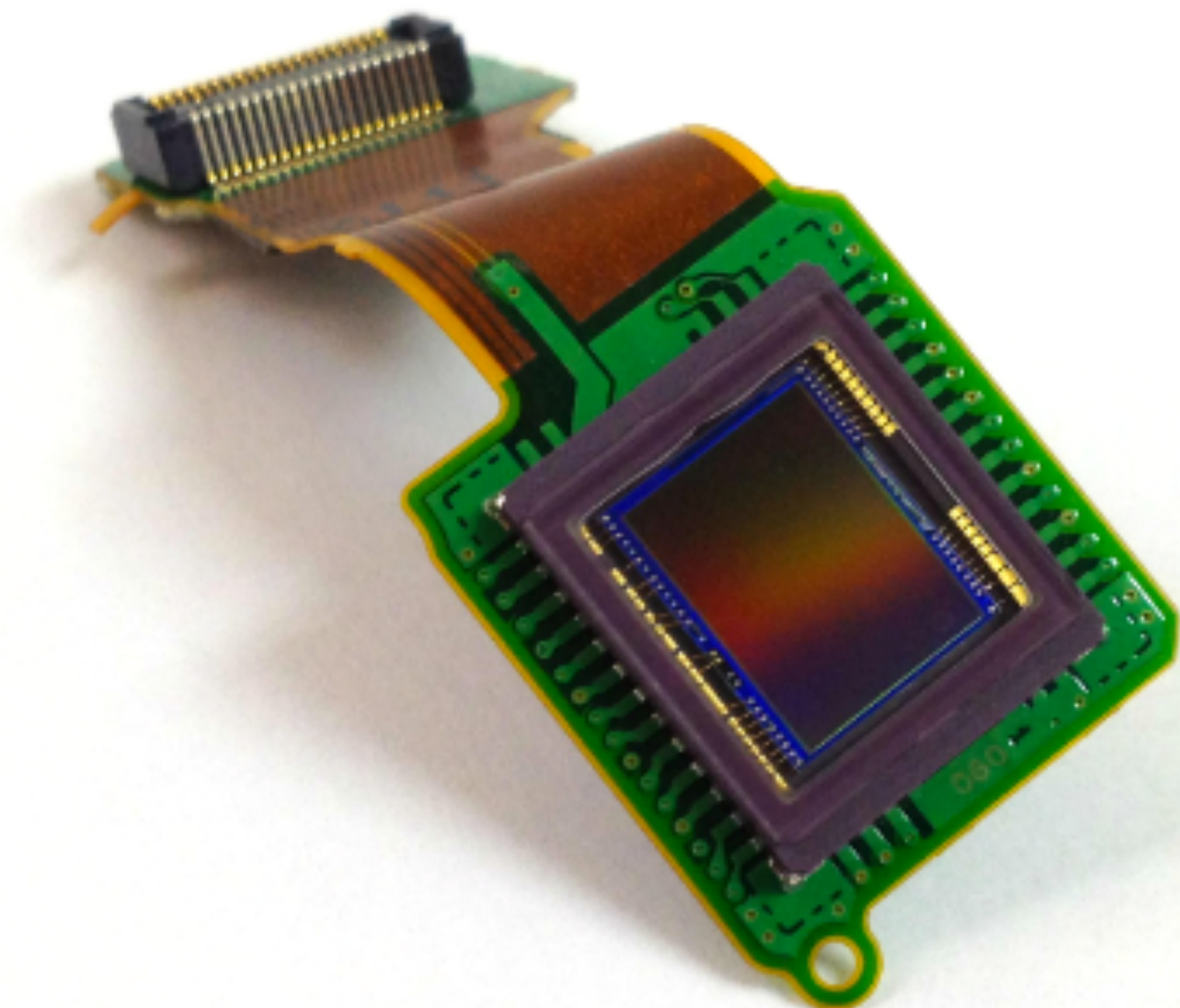
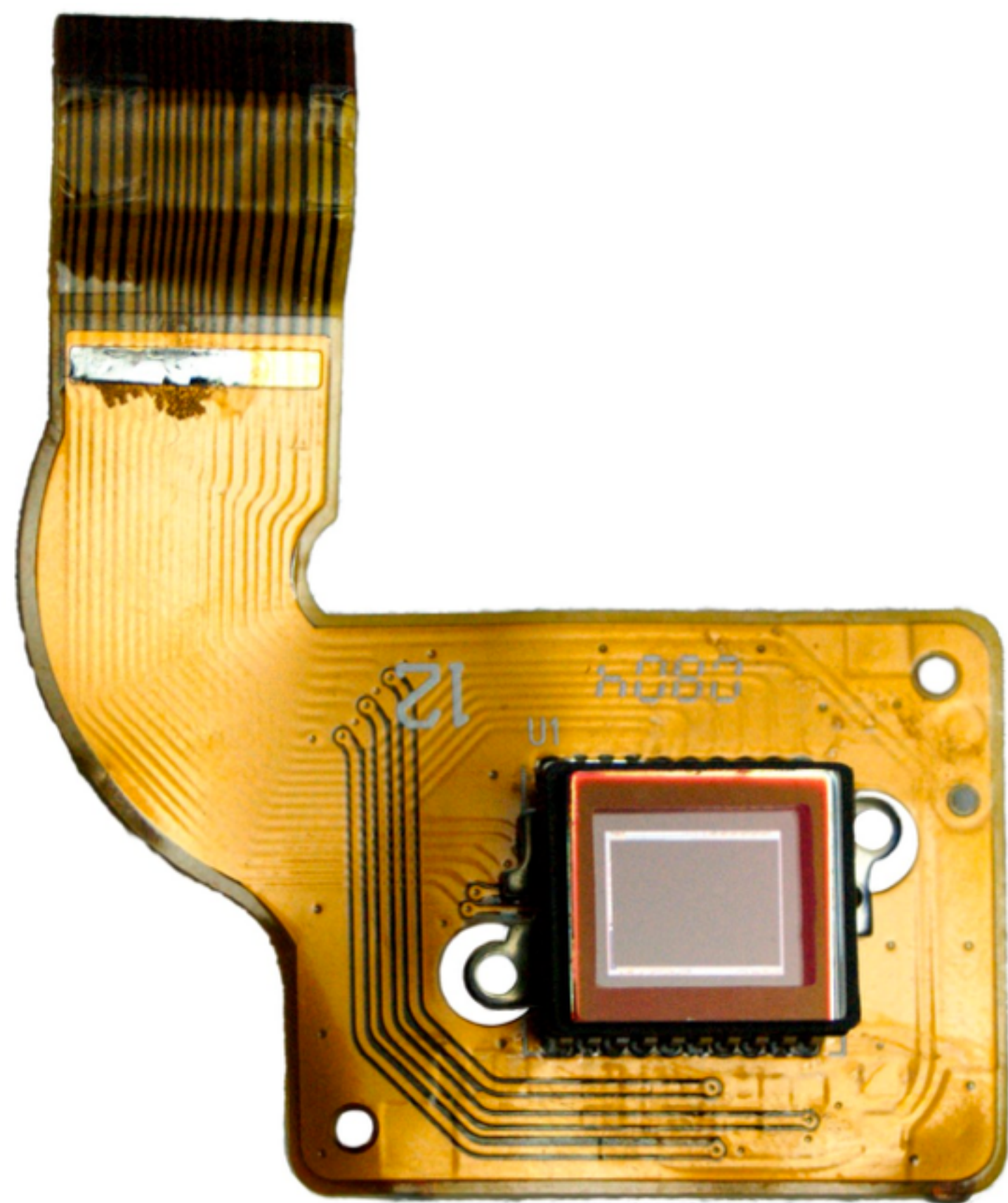
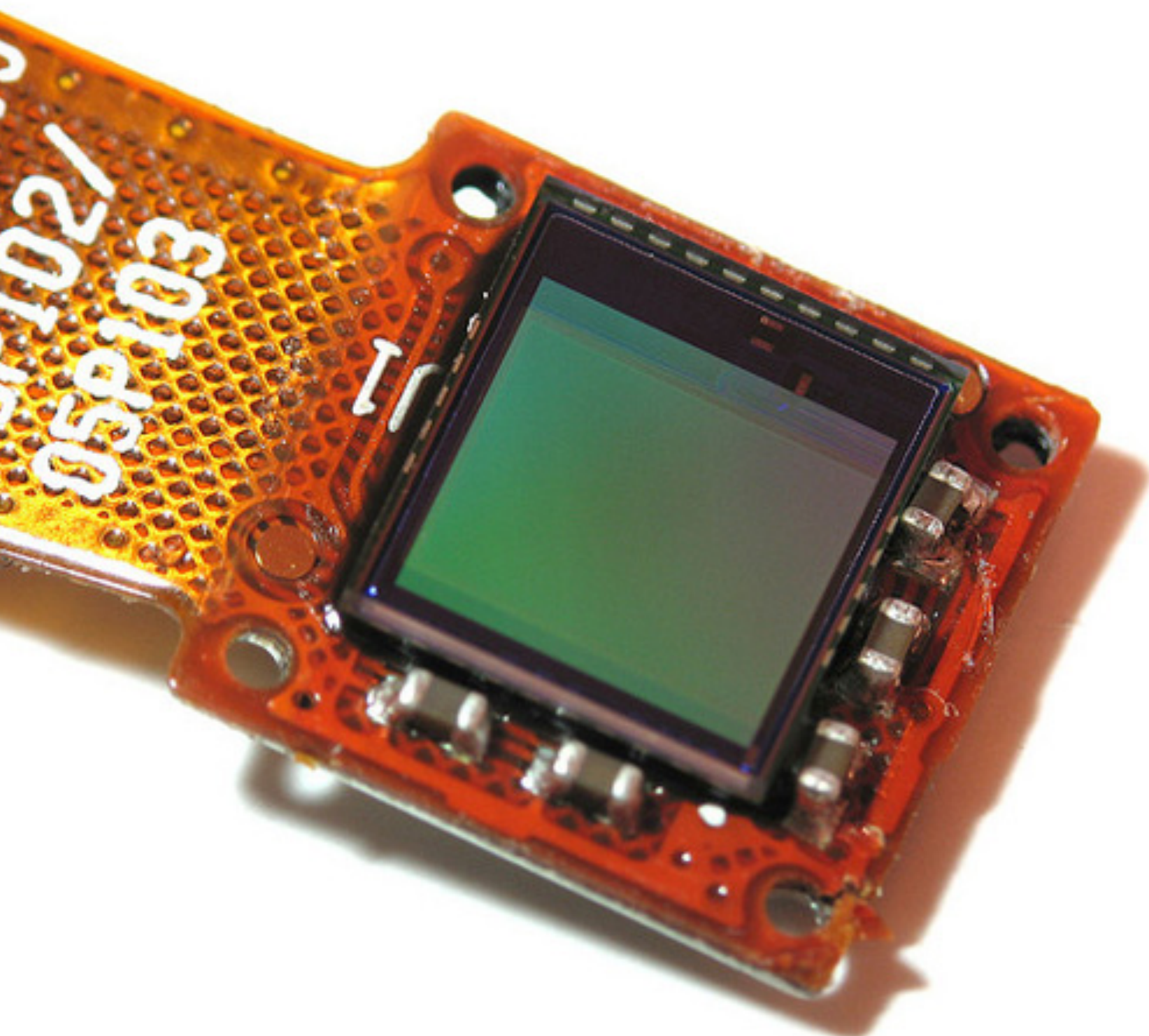




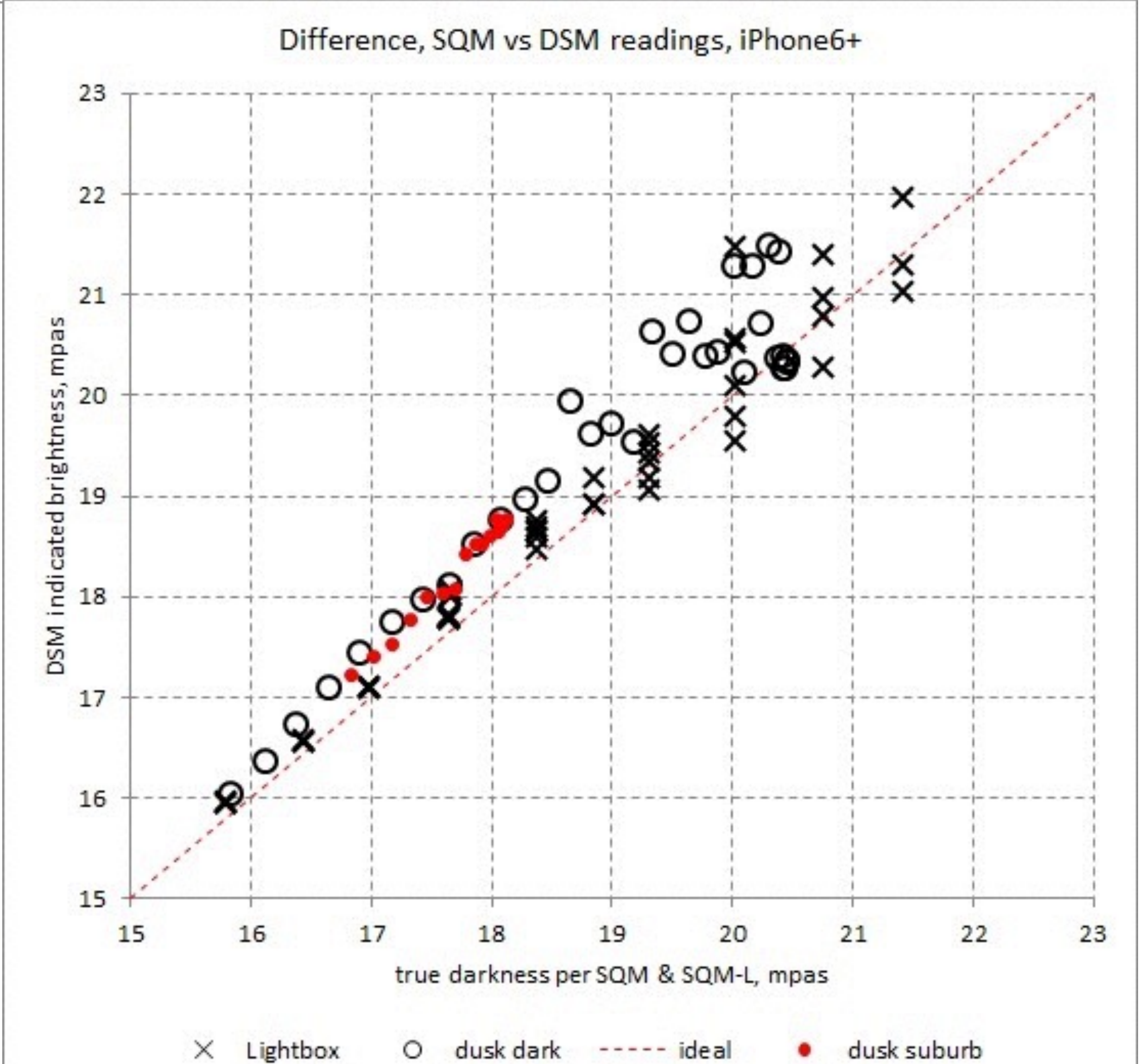
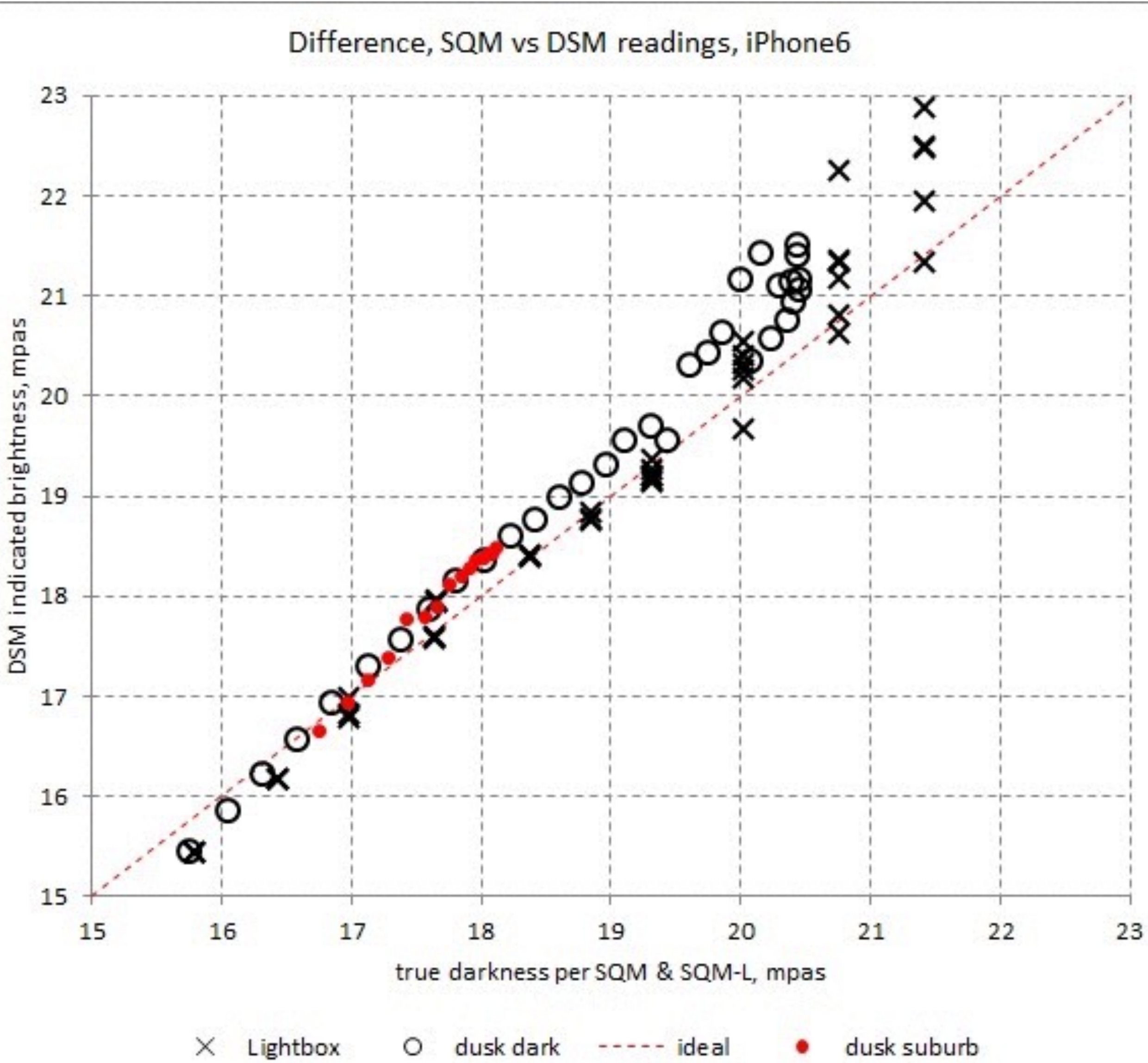
Smartphone manufacturer share by operating system

Q2 2012, US mobile subscribers





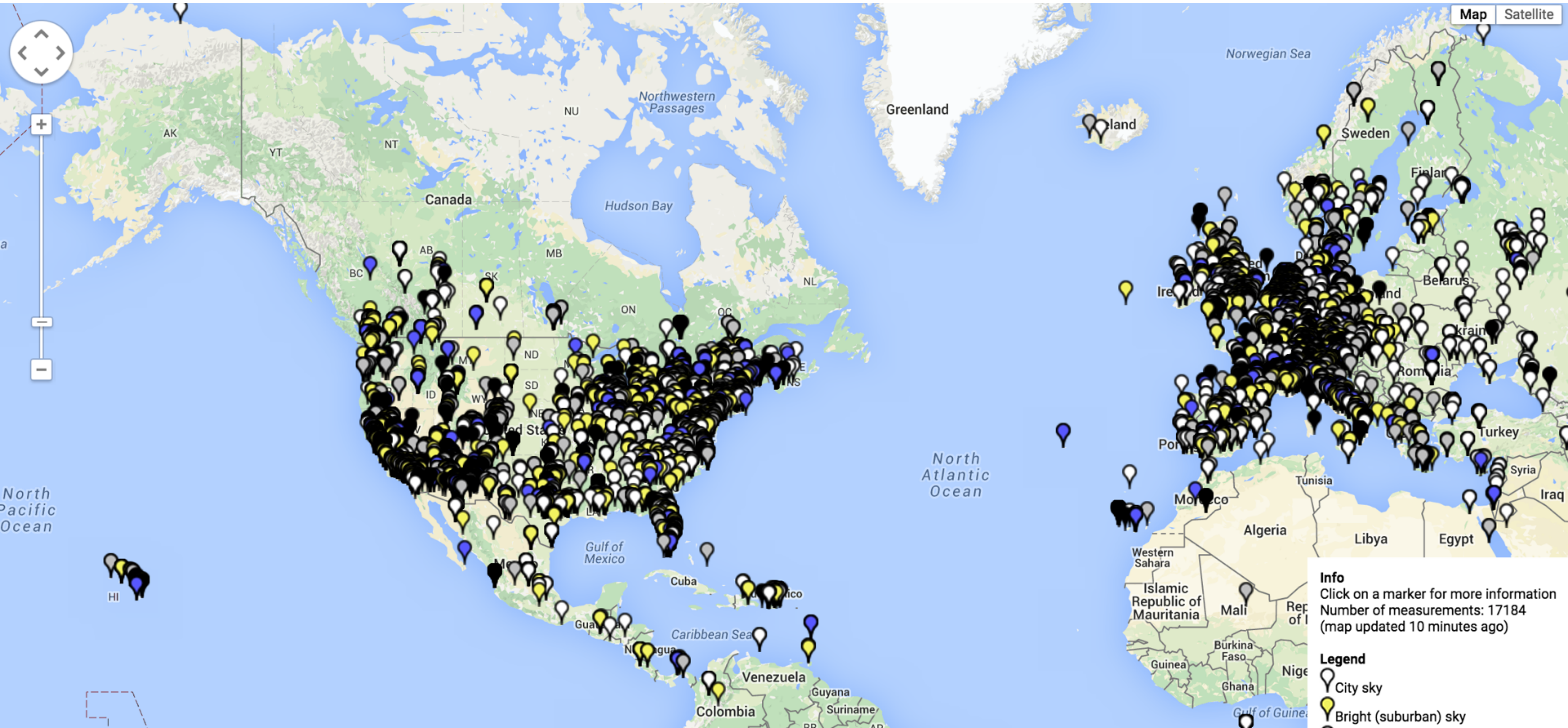
Performance: SQM vs DSM



Results

- 3 509 (active) users
- 17 100 measurements

Connection with
Globe at Night map



Reviews

*"As explained in the graphics provided on the app's download page, it's a two step process ... calibrate the camera by doing a "dark" (covering the camera lens and making an exposure) and then measure the sky. The problem is that whatever criteria the program is using to **estimate sky brightness is very flawed**"*

*"The app gives inconsistent results telling me I'm either in the inner city or an urban area. Both results are way off and differ substantially from test to test. **Too bad, this could have been useful**"*

Issue: using the app with full moon or under street lamps

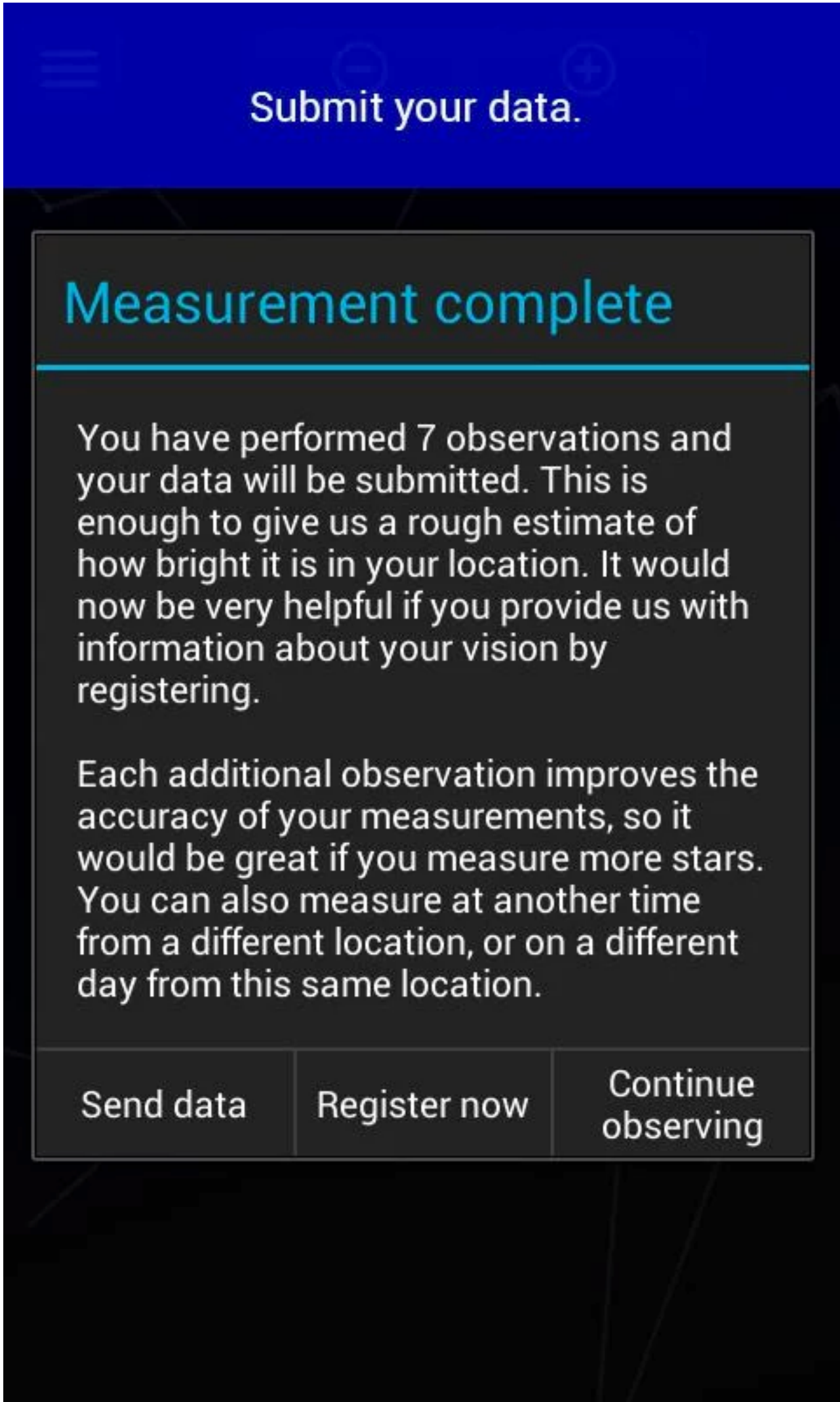
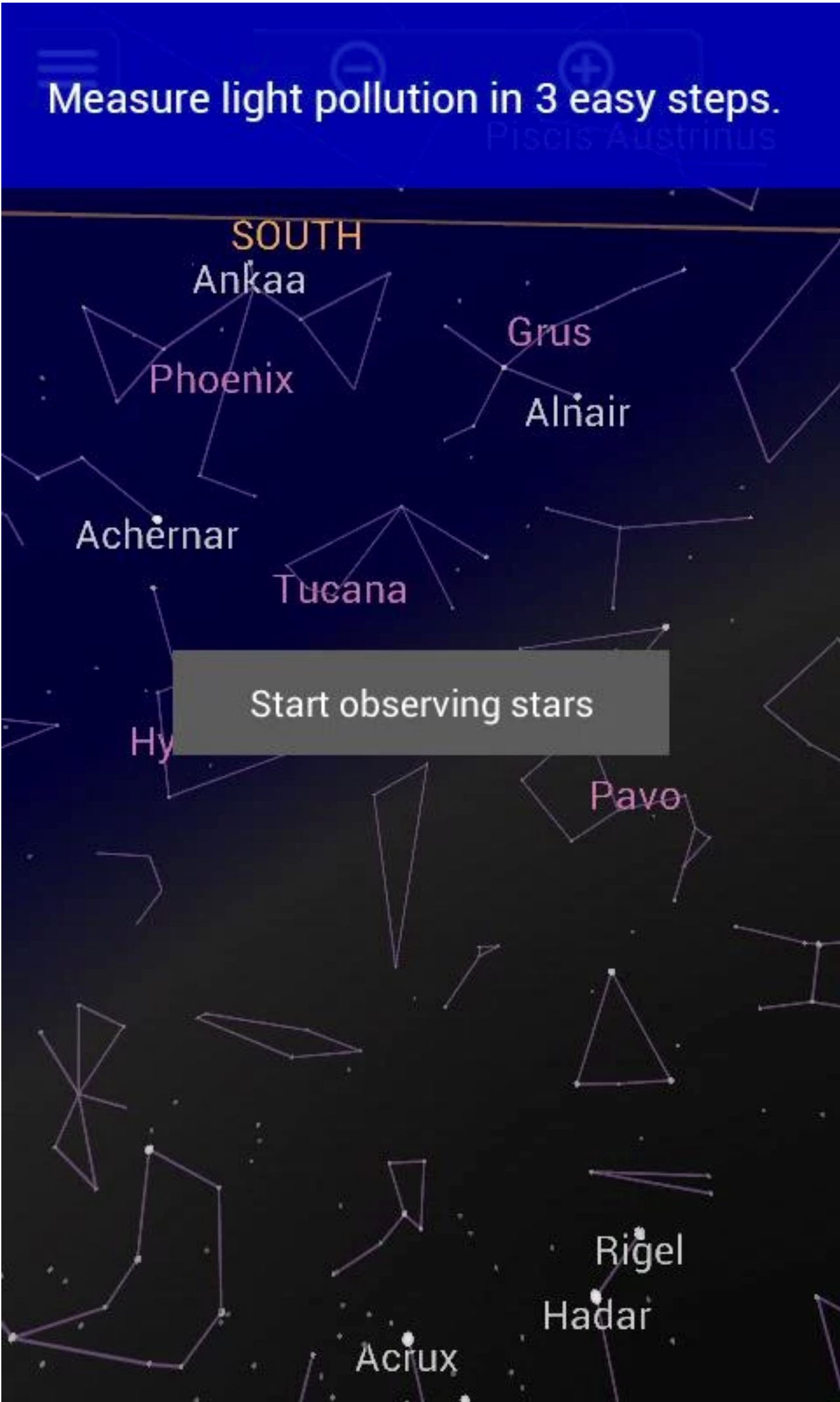
What's next? ver 2.0

- User Interface improvement / better instructions
- Campaign in September (During the 100 Hours of Light)
- Sustainability – Funding to keep the app free (Updates and backend data processing)
- Analyse the data
- Develop educational material
- Relation between output & energy waste

Other apps about light pollution



Loss of Night



Other apps about light pollution

FM19 p.14

IAU General Assembly, 3-14 Aug., 2015, Honolulu, Hawaii

Night Sky Brightness Measurement by the Public through a Mobile Phone App

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Abstract: We have performed a measurement of brightness of the night sky by using a smartphone app by collaborating between astronomers and a weather information company. Participants of the measurement look up the night sky by naked eyes and find stars in Orion, and send a response of a questionnaire on the app. This simple procedure and large number of user of the app allow us to collect as much as several thousand responses per night. The measured points distributed all over Japan. From this big data set, we successfully made high density and snapshot maps of the night sky brightness. Even though it is very simple measurement, we can find a trend that the fainter stars are getting to be observable as a function of distance from the center of metropolis.

1. Introduction

The brightness (darkness) of the night sky is important not only for astronomers but also for the public people, because some previous studies suggested that light pollution may affect human health and ecosystem in various ways.

In Japan, the night sky brightness had been measured by Ministry of Environment for a few decades^[1]. Since abort of the measurement by government, a private group have conducted a similar measurement^[2]. Recently some global efforts have been also conducted^[3]. However the number of measured position is limited because the measurement needs some apparatus and it tends to take long time.

Here we have carried out a large survey of the night sky brightness in Japan using a simple questionnaire on a social function of smartphone app. Our purposes are (1) to make a high density map of sky darkness and (2) to provide many people a motive experience in gazing star and enjoying astronomy.

2. Method

Sora-Mission

We made a questionnaire on a social function "Sora-Mission" in the smartphone app "Weathernews Touch" which is provided by Weathernews Inc.

- ✓ User of app: > 6.5 million
- ✓ One question with four options
- ✓ When users answer the questionnaire, result is provided immediately.
- ✓ Users of the app are interested in weather generally, seem less interested in astronomy. Therefore our target users are not only fans of astronomy but include a wider range of people.

"Let's look up at the stars !"

- ✓ **Purpose** : To measure darkness of the sky all over Japan with easy method.
- ✓ **Date** : Night time on 2014/2/5, 23, 24, 26
- ✓ **Questionnaire** : How many stars can you find in the southern part of the Orion with your naked eyes?
[Options]
 - Cannot find Tristar
 - Only Tristar
 - Tristar and mini-Tristar
 - more than above
- ✓ **Announcement** :
In a TV program for weather information "SOLiVE24", an explanation was given^[4].



A Picture of Sora-Mission



Measured region.



Response from audience in the internet chat

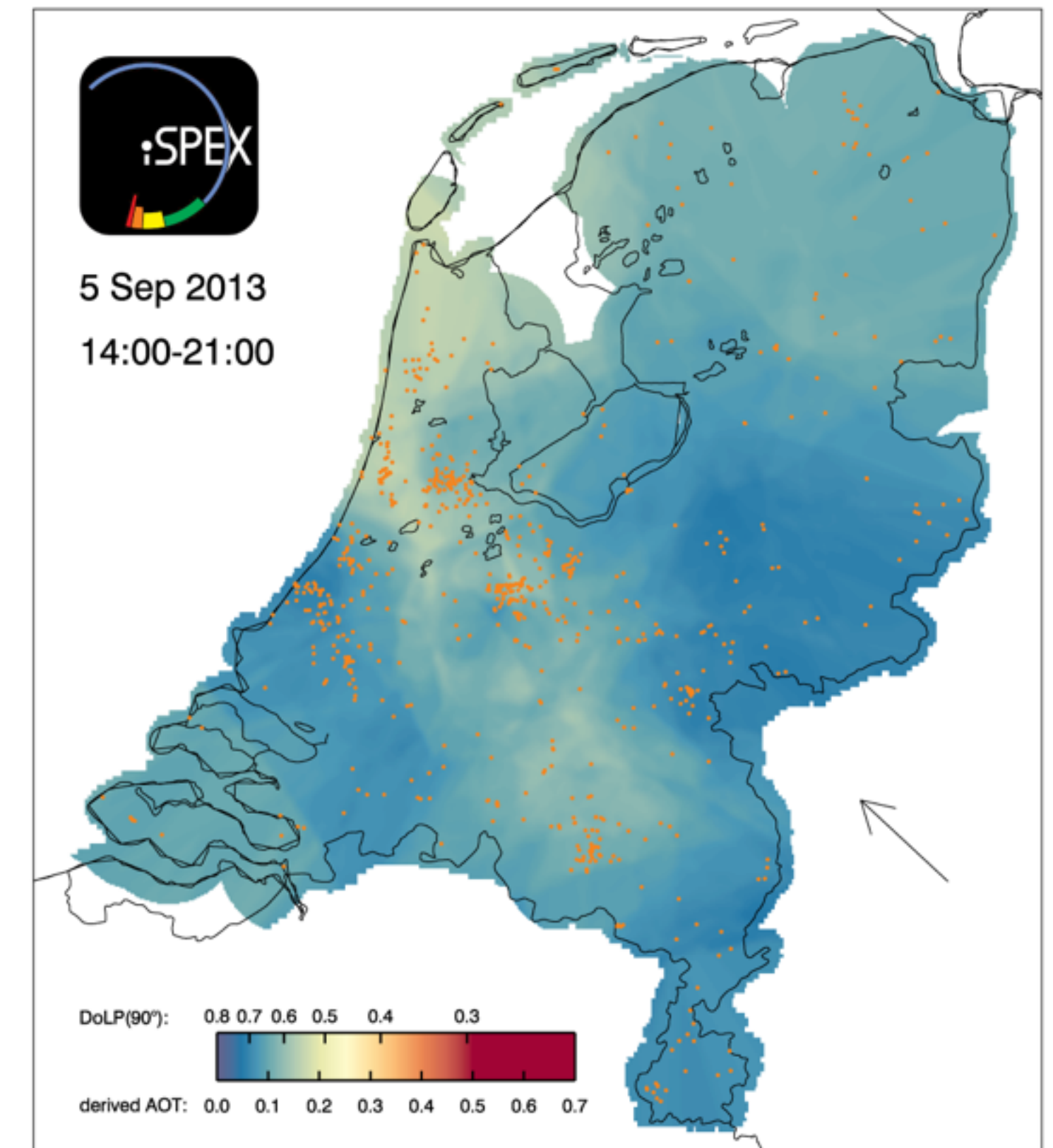
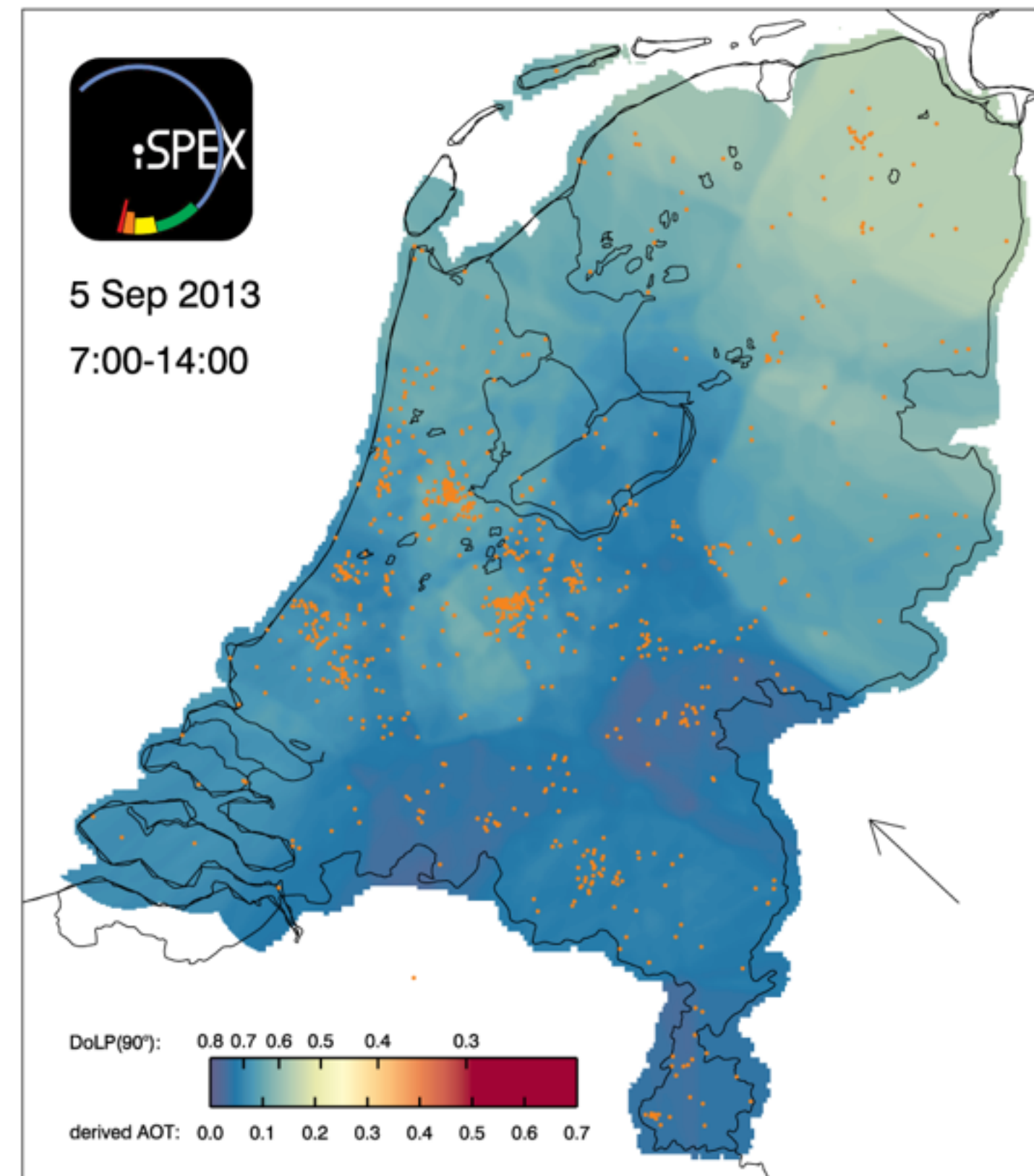
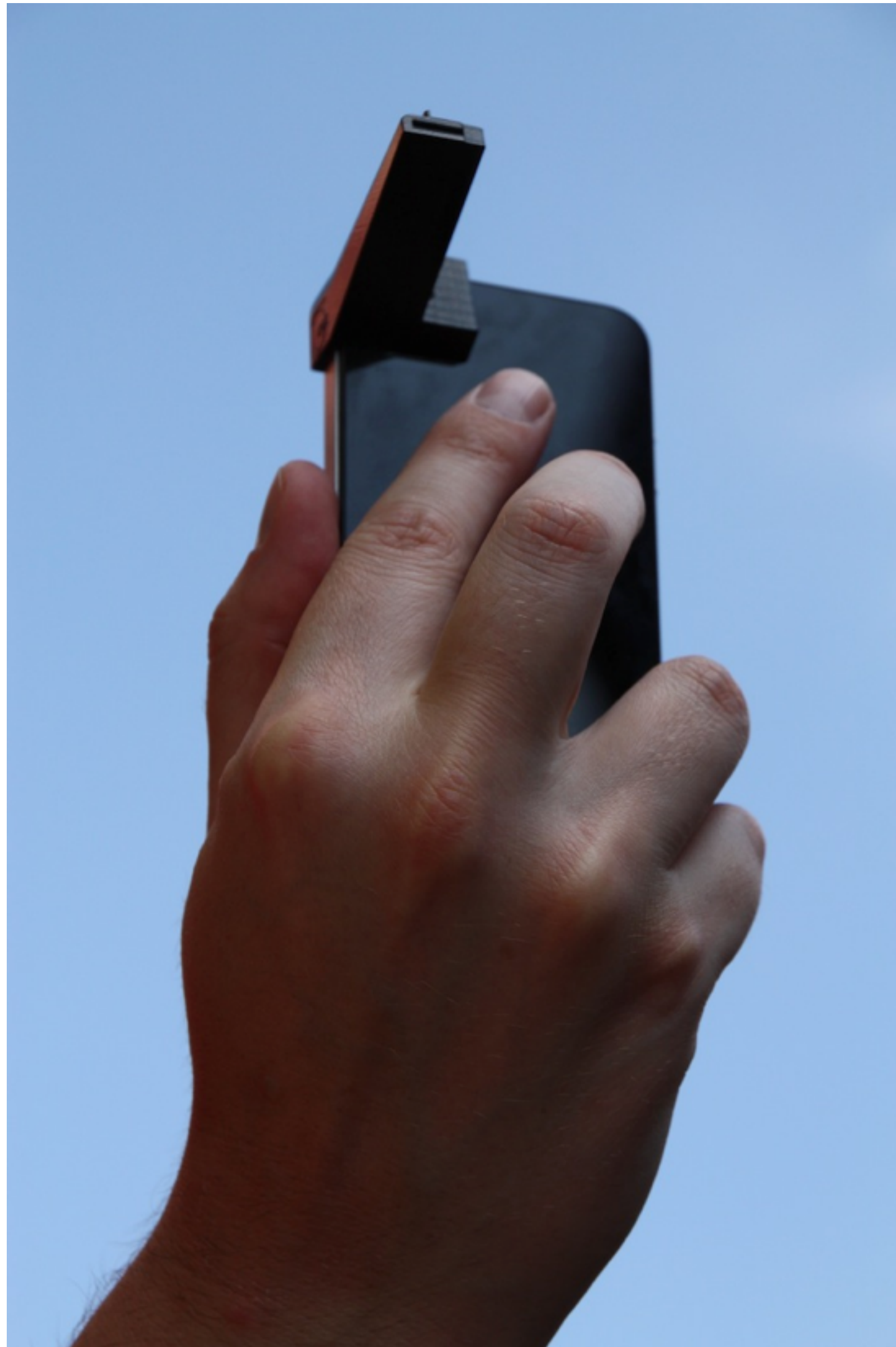
Explanation in "SOLiVE24"

Smartphone Science

iSPEX: measure aerosols with your smartphone



LIGHT2015
PHOTONICS
DISCOVER THE POWER OF LIGHT



www.ispex.nl/en/

Keller, Snik, Russo, Hendriks, 2015



Dark Sky Meter – IYL2015

www.unawe.org/dsm/
www.iau.org/iyl/

Concept and Development: Norbert Schmidt
(www.ddq.nl)

Coordination for IYL2015 Cosmic Light: Pedro Russo
(Leiden University)

Design: Robin Allen (Leiden University)

Background image: L. Laveder (The World at Night)

Acknowledgements: Vance Purdy, B. Trafeshi (The World at Night), Sze-leung Cheung, Frans Snik, Mike Weasner