



Live Aurora Network

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liveaurorawork.com

Abstract

How it Started: Live Aurora Network is the brainchild of founders Steve and Tony Collins. The brothers traveled around the Northern hemisphere searching for the magical lights, time after time they spent hours sitting in a field looking up at a clear sky with an Aurora predicted, watching all the Apps available to them... with no results! Or there was simply no Aurora forecast. Or it was just too cloudy. Steve and Tony decided they needed real-time alerts and not just a forecast. Live Aurora Network was born. Live Aurora Network is an innovative real-time detection system designed to improve your chances of seeing the Northern Lights in person or by viewing remotely. Advances in camera technology, Internet video and social media have given people around the world the opportunity to experience the wonder of the Aurora. The subtlety of the lights previously required long camera exposures of 20 to 30 seconds to capture them. This blurred out some of the details and produced time-lapse videos that were down-sampled versions of the real display. A Solution: Using Sony's a7SII camera Live Aurora Network is able to stream Aurora video at 30fps. Audiences are now provided a more authentic aurora display using the Live Aurora Network iPhone/Android App. Live Aurora Network has seven camera systems to-date in Norway, Iceland and Alaska and with plans for more installations. An Aurora detection algorithm developed in coordination with our partner, Mike McCormack (HAM callsign NQ10) detects the presence of Aurora in a live image instantly alerting App users to the presence of Aurora. Scientific Use: Following discussions with scientists specializing in the field of The Northern Lights, it became apparent that the data might be of use to the scientific community. Live Aurora Network has also collaborated with Aurorasaurus (@tweetaurora) which is a citizen science project gathering real-time data about aurora sightings notifying users when the Northern Lights are likely visible in their area. Live Aurora Network smartphone App is available for download at the App store.

Goals

- Design, Build, Install Network of Aurora cameras
- Live stream Aurora video
- Real-time Aurora Detection algorithm
- Time-lapse production
- Aurora Detection Alerts
- SmartPhone App for viewing

Requirements

- Sensitive to night sky at video frame rate, 30fps
- Live video streaming
- Cold weather operation
- Remote Access
- Reliable operation

Solution

- Camera: Sony A7Sii
- Computer: Intel NUC
- Control Software: IPTimelapse
- Detection Algorithm: IPTimelapse
- Enclosure: Customized Pelco
- Power options: 12vdc, PoE, 120/240AC



Sony A7Sii

Implementation

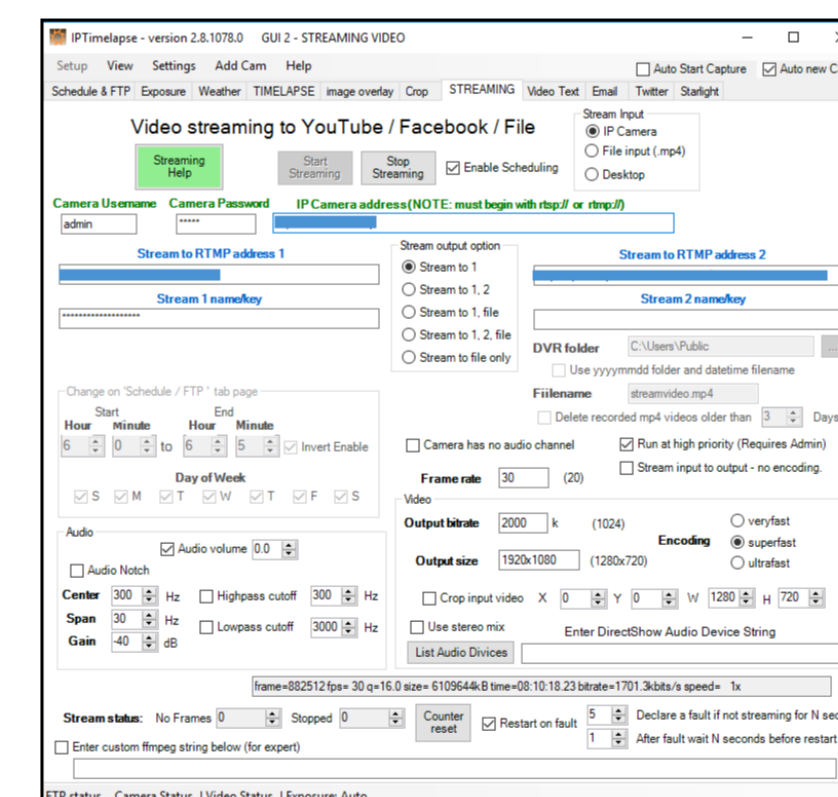
Hardware

- 7 units constructed

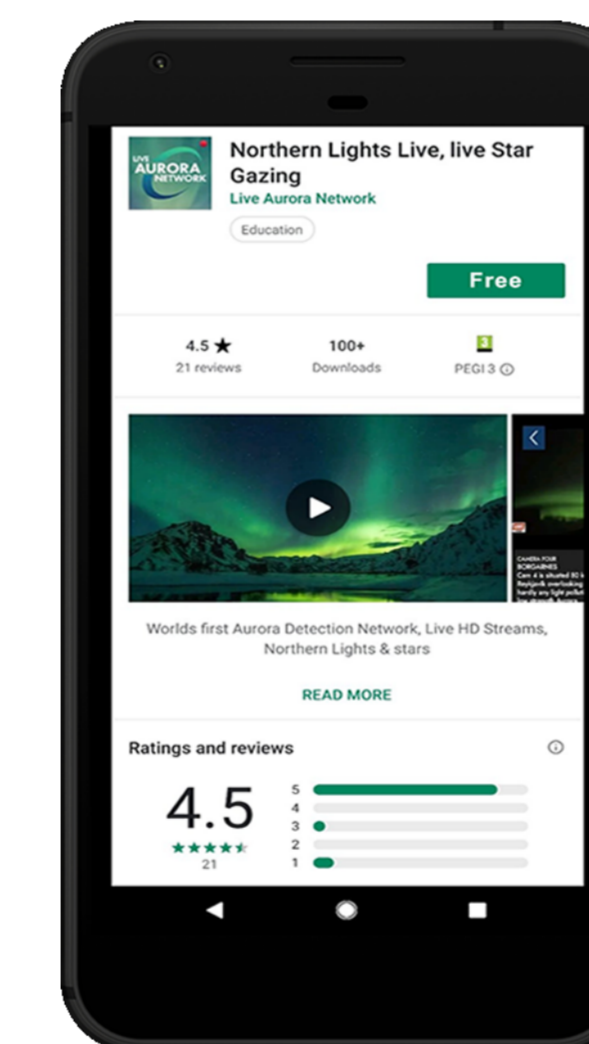


Software

- Video Streaming
- Aurora Detection
- Time-Lapse



App

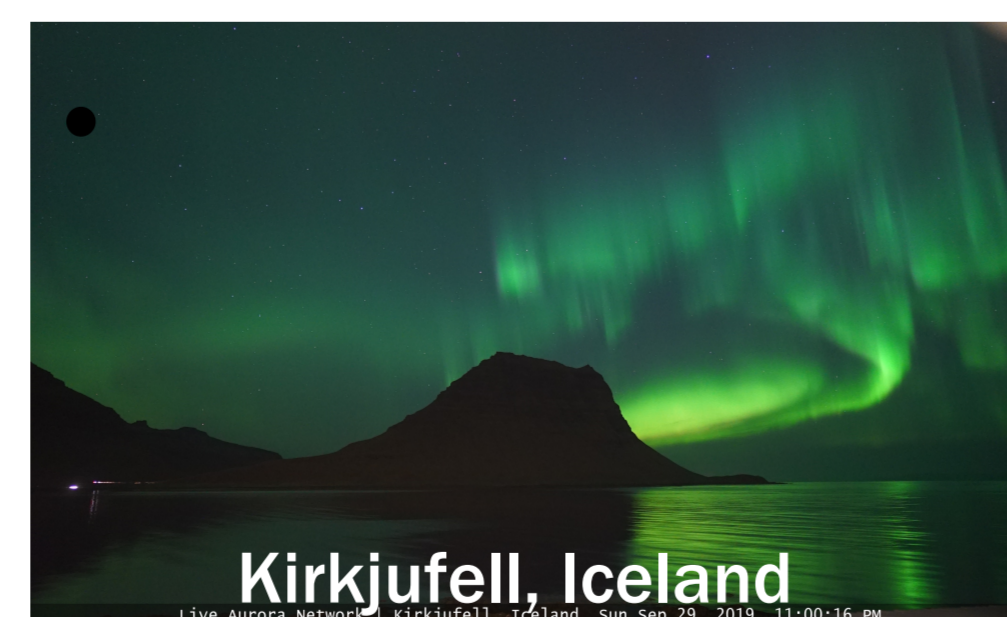


LiveAuroraNetwork.com

- SmartPhone app live streaming
- Aurora detection alerts sent to your phone

Deployment

7 Camera Installations



Kirkjufell, Iceland



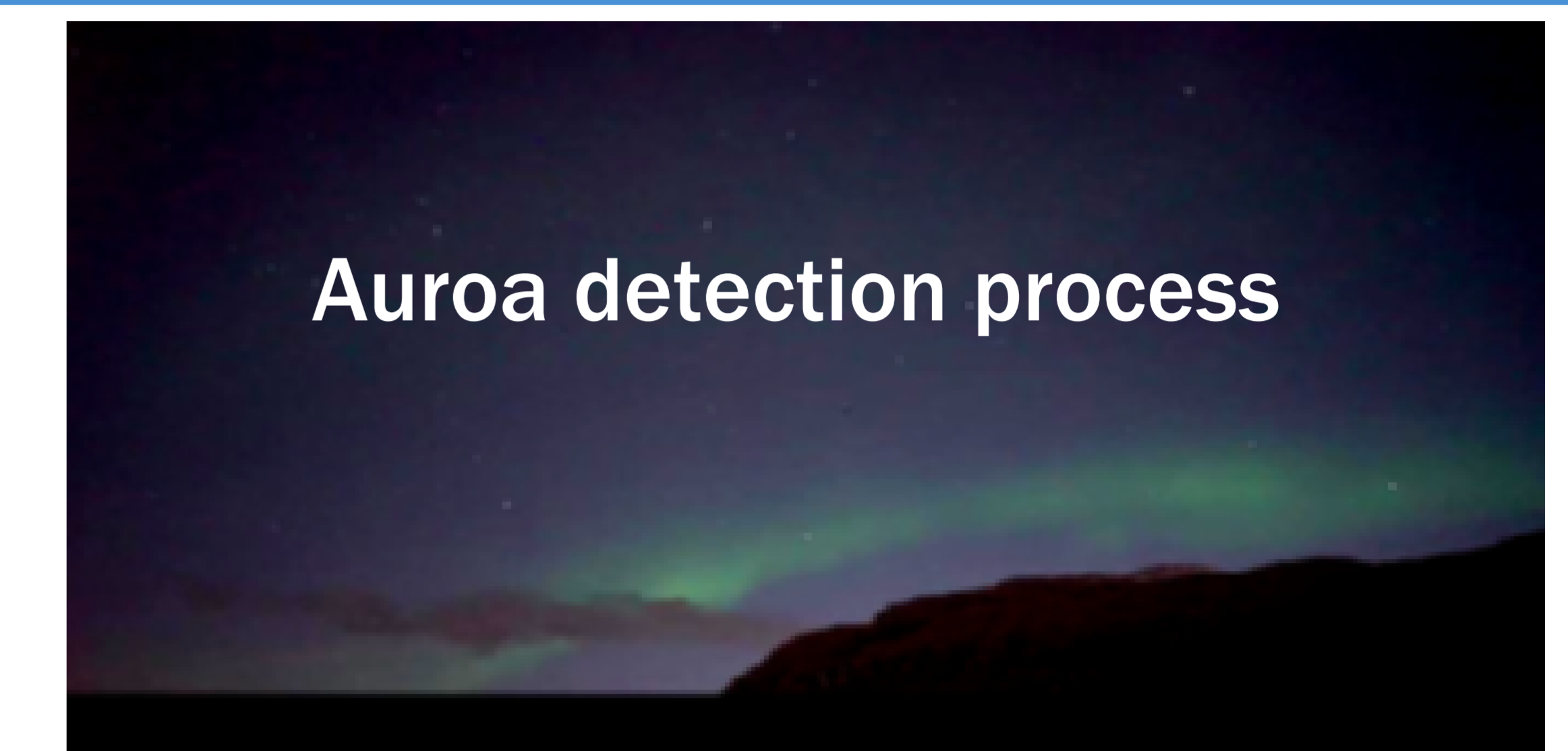
Lofoten, Norway

- Aurora Oval
- Camera locations



Iceland: 5 • Norway: 1 • Alaska: 1

Aurora Detection Algorithm



Aurora detection process

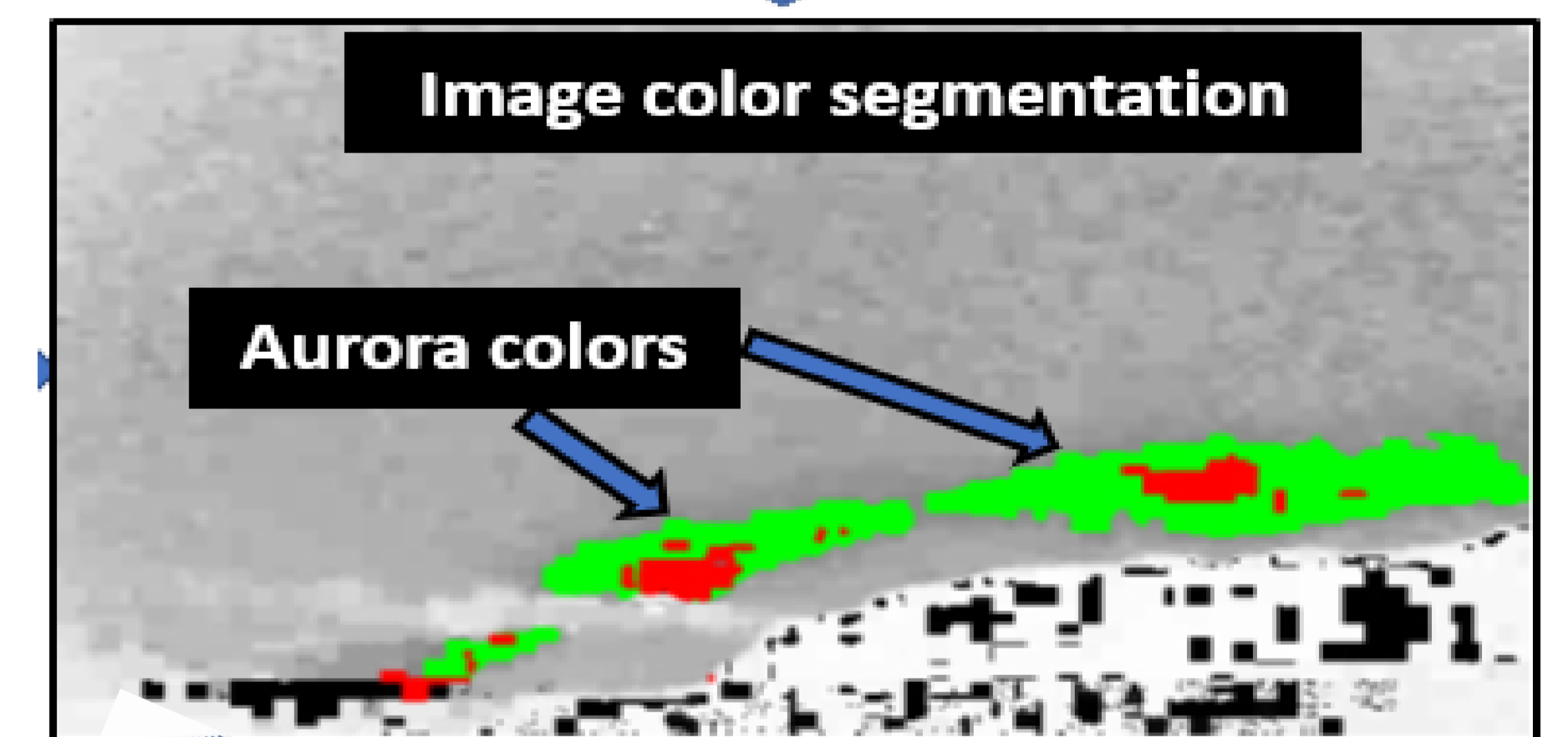
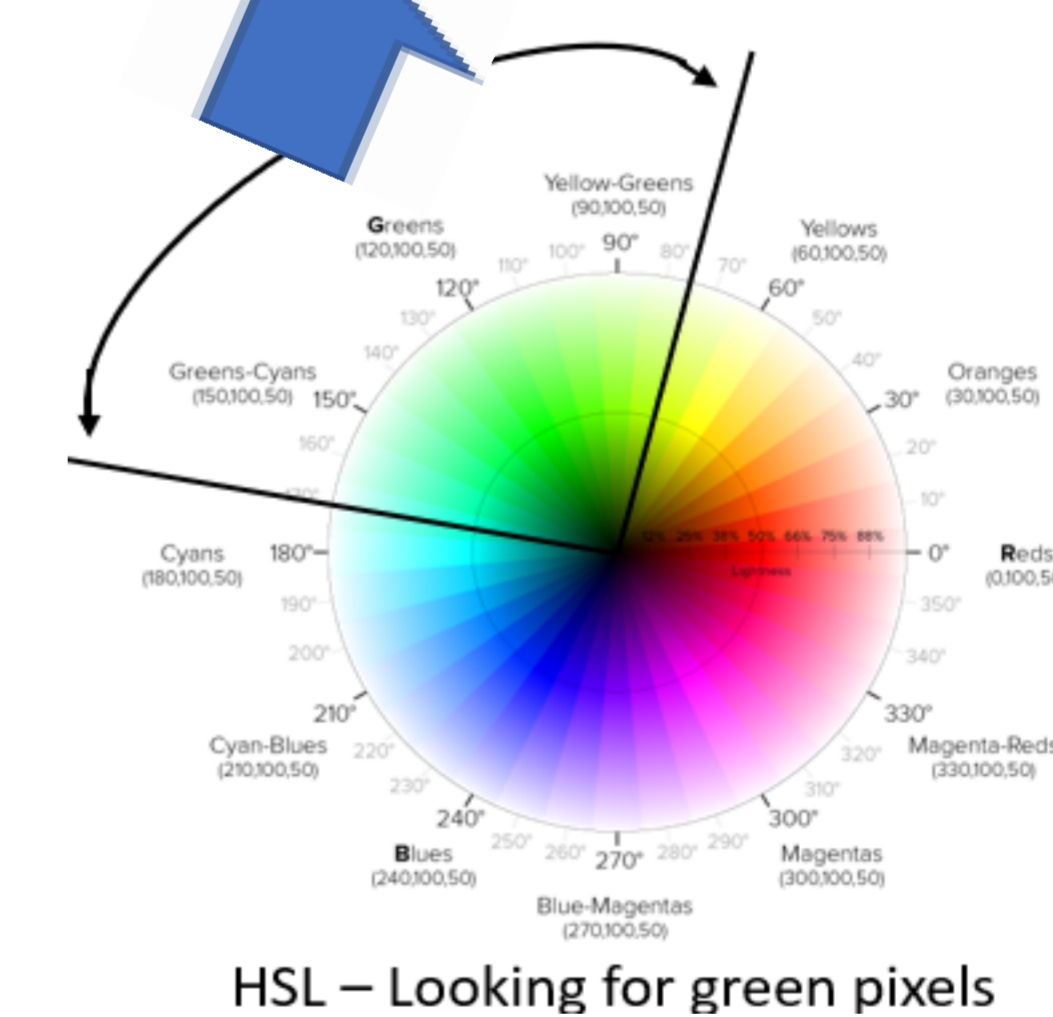


Image color segmentation

Aurora colors



- Color segmentation via HSL mapping
- Alert message sent immediately upon Aurora detection

Aurora Decision – Y/N?
 [Area, Brightness] > Threshold

Going Forward

- New cameras - fill gaps in Northern Hemisphere
- Detection algorithm updates
 - PD/PFA ROC curve performance baseline
 - Additional Aurora features
 - Implement Naive Bayes classifier
- 3D Stereoscopic cameras for VR viewing
- Collaboration with science community /Auroasauris