# SHOOTING THE AURORA BOREALIS

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## by Dick Hutchinson ©

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## Where, Experience, Exposures and Film

I live 48 miles south of the Arctic Circle in Circle, Alaska. It is a small town with a population of 107. No city water or sewer but we do have power and telephone. I've been here for 35 years and have been photographing the aurora for the last 12 years. Circle is on the banks of the Yukon River and at the end of the Steese Highway. Circle was thought to be on the Arctic Circle when established in 1893. The old timers were not too far off.

Can you believe running the Internet at 9600? Toll charges to boot, not many people in the bush do. Earth station upgrade came in April, 2000. The upgrade wasn't much so now I'm a Starband satellite dish user getting a PC education, :-( At least I'm networking my Macs.

I get to do a lot of aurora watching and shooting here in Circle, the short days of winter give me plenty of opportunity.

Here are a few hints to get you started taking your own aurora photos. Don't be afraid to experiment with different exposures because night photography really is an experiment. When the aurora is extremely bright (casting a shadow) it is usually moving too fast for 100 speed film. A nice glow that stands out and moves fairly slow records better on film. Try lots of different exposures when shooting at night, occasionally you will get some pleasant surprises. Increase or decrease exposure time in 30% increments. I generally go more for the increase than the decrease. Film records a lot more than what the eye can see. The following jpeg has ball park exposure times in seconds.

| F STOP | FILM SPEED 50 | 100 | 200 | 400 | 800 | 1000 |
|---|---|---|---|---|---|---|
| 1.4 | 60 | 30 | 15 | 8 | 4 | 3 |
| 1.8 | 90 | 45 | 23 | 12 | 6 | 5 |
| 2.0 | 120 | 60 | 30 | 15 | 8 | 6 |
| 2.8 | 240 | 120 | 60 | 30 | 15 | 12 |
| 3.5 | | | 90 | 45 | 23 | 18 |
| 4.0 | | | 120 | 60 | 30 | 25 |

I am aware that most people don't have f1.4 lenses so I have experimented with faster films using f2.8 lenses. Depending on the intensity of the aurora a time of 25 to 40 seconds with f2.8 lenses and 400 film works best. With f4 lenses I'd use 1000 speed film and expose for 20 to 40 seconds. An overexposed negative is better than an underexposed one. When using faster films I prefer print film as I think they have finer grain. The way films are being improved all the time even that is becoming a personal preference. Maybe soon there will be digital cameras that are capable of capturing the aurora, I'm not aware of any yet.

## EQUIPMENT

I'm using a Nikon 8008s with 35mm and 28mm f1.4 lenses (my kids are grown and gone). 35mm (and wider) lenses are the best because you'll have lesser star trailing. My limit with a 35mm lens is 30 seconds. With a 50mm lens at 15 seconds star trails are beginning to show and you don't have an awful lot of sky in your picture. A general rule is; 600 divided by the focal length of the lens equals the time in seconds before star trails start to appear.

With my Nikon lenses I have found that long exposures result in concentric circles showing up in the center of the images when I use a filter of any kind. Nikon says this is due to the high reflectivity of the aurora. Thanks to the University of Alaska forecaster, Chuck Deehr, the explanation follows. "These are interference fringes due to the parallel faces of the filter and to the narrow spectral emission at 5577 Angstroms in the aurora. That green, atomic oxygen emission line is the strongest emission in the aurora near our film and eye peak sensitivity, so it shows up first when there is any device in the optical path which sorts out the spectral emissions." So, don't use filters!

## PROCESSING

I've used fast-photo labs and haven't been happy with the results. I now buy film mailers for my Provia ($3.09 at B&H Photo in N.Y.) to send for processing to Fuji TriColor Lab, PO Box 52008, Phoenix, AZ 85072-2008. I send any Kodak chromes ( $4.29) to Qualex in Fair Lawn New Jersey. Add $2.69 for pushing Ektachrome 1 stop. Over the years each lab has messed up once, I can't complain about either of them. My prints are done in Fairbanks by local labs.

TIP: Overexpose the first frame to a light so the lab tech will know where to start. I've had rolls get off to a bad first cut and this little trick seems to prevent that.

Never try for frame 37 in cold conditions with a motorized camera. Your film might break and by the time you fix the problem the light show could be over. The aurora can be faint for hours, dazzling the next 5 minutes and then, just as suddenly, over. To keep warm, I just stay close to my pickup. After 15 minutes out in 40 below zero temperatures the camera and I need to warm up. I use mitten-gloves, fingers bare and a flap to pull over them. Generally I only freeze 4 fingers. I also use some electrical tape and tape the lens with one or two wraps around the barrel so it stays in sharp focus. Newer auto focus lenses when manually focused can go beyond infinity and it is pretty hard for me to focus in the dark (getting old). Manual focus lenses I've used don't have that problem and they can be turned to the stop. I tape mine anyway because it's one less accident waiting to happen in the dark. It's also nice to have some sort of covering on the tripod legs where you pick it up. Taping on some paper towels or some cloth works. The extreme cold of arctic nights creates very dry air, therefore, short periods in and out of a warm vehicle do not create condensation problems. If you really freeze a camera, you should place it in a zip lock plastic bag before thawing. Condensation will form on the outside of the bag.

If you plan to visit Interior Alaska from late-August thru mid-April don't leave town without proper clothing. If you have it with you, you won't need it (Murphy's Law). Circle is a 3.5 to 5 hour 160 mile drive from Fairbanks on the Steese Highway. The road is maintained year round and during the winter months it is best to travel during the day. There is a sign in Fox (11 miles N of Fbks.) that gives road information. There is lodging at Circle Hot Springs Resort (907-520-5113). Our views of the aurora are some of the best. You can e-mail me for more information about the Circle area.

Hale Bopp was just too much. Taken 3/30/97 using Ektachrome 400X. Nikon 35mm f1.4, 22 seconds at f2.

Another. Lumiere pushed 1 stop, 28mm at 1.4 for 15 seconds. (Lumiere is no longer made)

The End of the Road sign at Circle City taken October 3rd at 15 seconds. The sign is illuminated by a street lamp 150 feet away.

## PHOTOS AND TECHNICAL DATA

The above images were shot in 1995 with the Nikon 8008 & 8008s, 28mm lens at f1.4 on Provia 100 film. The first was October 3rd at a 15 second exposure showing the aurora over the original homestead house in Circle City. It was built in 1911. The windows look close to the ground because they are. The house has sunk about 4 feet into the permafrost.

The second shot above is of a raft on the Yukon River shot on August 22nd at a 15 second exposure. We have lots of rafters float down from Whitehorse, Dawson and Eagle every year, some pull out here and the hardy ones continue another 1000 miles to the Bering Sea.

Kodak Gold 200 was also used for this 15 second exposure taken in the first week of September 95. 28mm lens at f1.4.

(The images below were shot with Provia 100)

When I'm looking at a scene like this taken in November '96' over Circle when it was -25°F, I forget the hardships of living in the North and wouldn't want to be anywhere else! 35mm, 20 seconds at f1.4

Northern lights above the Yukon Flats with three bands of color. 20 second exposure in October of '95.

Circle City airport runway beacon shines in the background of this image exposed for 20 seconds in October.

A river boat parked on the bank of the Yukon under the aurora. Boats were lit with a flashlight. Shot at 10 seconds, August 22nd.

The sunset highlights the frame of this shot taken on August 22nd at 10 second exposure.

Green swirling lights over the Circle City airstrip at 20 second exposure. The foreground light is from airport rotating beacon.

Reflection of the northern lights on the Yukon River at 30 seconds on October 19th. The river is running ice and fog rises in the background.

# Latest Images

I'll try and be updating more regularly but I just seem to run out of hours to do things. Seem to be needing more sleep as I get grayer ;-)

November 6, 2001. I missed the show on the 5th but there was some on the 6th. The river ice has quit running and there was a small open section of water below town, light fog and the moon was rising. Kodak Gold 200, 20 seconds with 28mm f1.4.

April 5, 2000. We had quite an auroral storm on the 5th and 6th. I received reports of sightings from as far south as Virginia. What was unusual for me here was that the southern sky was covered. For those of you who don't mind large files (1.6mb), here is an animated sequence of 35 3 second exposures on Kodak's Ektachrome 400X pushed 1 stop with 28mm f1.4

March 5, 2000. Sometimes a 28mm just doesn't seem wide enough. We had a pretty nice display that evening and the entire sky was covered. Occasionally I'll just quit taking pictures and go round and round taking in the wonder of it all. Provia 100F, 28mm f1.4 for 30 seconds.

March 5, 2000. A simple shot over the Circle campground looking SE. New Provia 100F, 28mm f1.4 for 30 seconds. This is my first time using this film and I'll try shorter exposures in the future.

February 2000. This is the most common sight over town with the basic green aurora. Provia 100, 28mm f1.4

for 25 seconds.

October 1999. I love shooting over open water and capturing reflections. This shot is looking SE with Jupiter shining brightly. Provia 100, 28mm f1.4 for 25 seconds.

September 1999. The aurora season is off to a good start but I haven't had much luck because of the weather. E100S, 28mm f1.4 for 22 seconds.

February 1999. A shot over the Yukon Trading Post, the trees heavy with snow. E100S pushed 1 stop. 28mm f1.4 for 15 seconds.

January 1999. A simple vertical ray over the local church. E100S pushed 1 stop. 28mm f1.4 for 15 seconds.

November 1998. If you use a little imagination (maybe I have too much) you might see the serpent about to gobble the moon. E100S pushed 1 stop. 28mm f1.4 for 15 seconds.

November 1998. Here is an example of light from a sodium vapor lamp coloring snow on trees and how a flash can make a dramatic difference. E100S pushed 1 stop. 28mm f1.4 for 12 seconds.

October 15,1998. A shot from the campground over the Yukon River during freezeup. The belt of Orion is reflecting on the water. E100S pushed 1 stop. 28mm f1.4 for 15 seconds.

September 25, 1998. For 30 years I've been traveling on the Yukon in an open riverboat and this Fall I finally bought a new boat. E100S pushed 1 stop. 28mm f1.4 for 12 seconds.

September 24,1998. We had an auroral storm that day but it was about over by the time it was dark enough here. I took these shots of the auroral corona about 9:15pm. I took a whole 36 exposure roll and had it made into a 188k movie by DC Spensley at Berkeley. The actual time running 36 exposures through the camera was was 84 seconds. Ektachrome 400X pushed 1 stop. 28mm f1.4 for 2 seconds.

March 22,1998. We had a small auroral storm show up quickly and I took this shot over my house . E200 pushed 1 stop. 28mm f1.4 for 8 seconds.

March 11,1998. This is my first attempt at animation. A total of 13 frames on Ektachrome 400X pushed 1 stop. Camera on motor drive for 2 second exposures for an elapsed time of about 35 seconds with 28mm f1.4. There was also a full moon out.

March 5,1998. I got tired of waiting for something to happen just before midnight so I called it quits. I just got settled in the house and looked out the window and the aurora was dancing. I rushed outside and took these shots from the front of my house looking NWest and East just after midnight. E200 pushed 1 stop. 28mm f1.4 for 8 seconds.

February 17,1998, -37F. We had a minor auroral storm for about an hour. These pictures are the usual green color and they showed some unusual patterns. I finally got to try Kodak's new E200 and I pushed it 1 stop. I like it and will be using more. I had company that week and this was the only night they had to photograph the aurora. Odd color in upper right is exhaust vapor from my truck. All exposed with 28mm f1.4 for 8 seconds and flash used on my visitors.

January 6,1998. It was a long dry spell this winter, for 3 months I didn't photograph the aurora. Not many opportunities due to the weather. The following 2 pics were shot with E100S at f1.4 for 15 seconds. There was about a half moon and I used the runway beacon for lighting. This was looking NW and the spruce trees were about 200 feet from the beacon. The pic below is looking SE a few minutes earlier. I never got far from the pickup as it was -47°F at the time.

The fall of 1997 has been pretty dismal for aurora watching due to cloudy and unusually warm weather. El Niño??? On 9/3 and 9/27 we had good viewing conditions. These 4 photos were taken on Kodak's E100S pushed 1 stop with 28mm f1.4 for 15 seconds. Here is one of my favorite subjects taken 9/3 while the leaves were still on the trees.

The aurora was extremely bright during its peak on 9/3 and gave the clouds a green color.

This photo was taken 9/27 from the campground in Circle. I used a 6 volt spotlight to illuminate the boats.

I wish I could supply sound with this picture of a fish wheel on the Yukon under the aurora. Taken 9/27, I used a flash trying to light the wheel a bit, could have used more. The gawdawful soft squeaks, squawks, moans and groans from the wooden axle could actually lull you to sleep if you were not watching the aurora. The fish wheel rotates due to the Yukon's current at around 6 RPM and the axle is lubricated from splashing water. Wet wood turning against wet wood. Some of the wheels in Circle have taken up to 400 Chum salmon a day.

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**For the straight scoop on the aurora, visit the Rocket Scientist.**

**For more information on Alaska and the aurora visit Jan Curtis's page. He has lots of interesting links and pretty pictures.**

# ON THE NASA ASTROPHOTOGRAPHY SITE

**my aurora photos have been selected as**

# Astronomy Picture of the Day

## January 1, 1997

**and**

## March 4, 1998

## FORECASTING THE AURORA

In the Spring of `95 the local paper started printing the aurora forecast. You can also get forecasts on-line at the University of Alaska, Fairbanks and at Michigan Technical University.

**Send comments and questions to Dick at**

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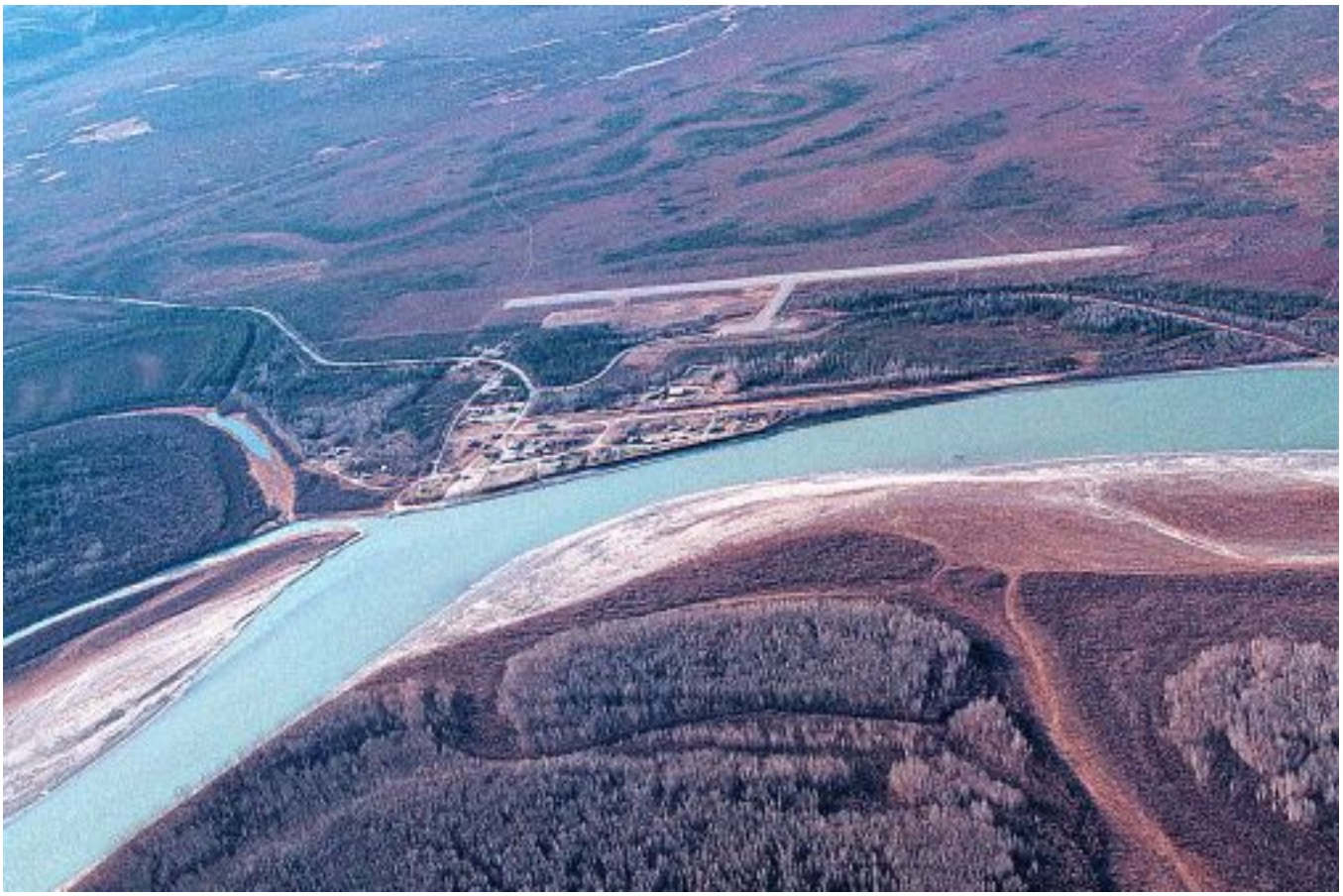
**Web master at**

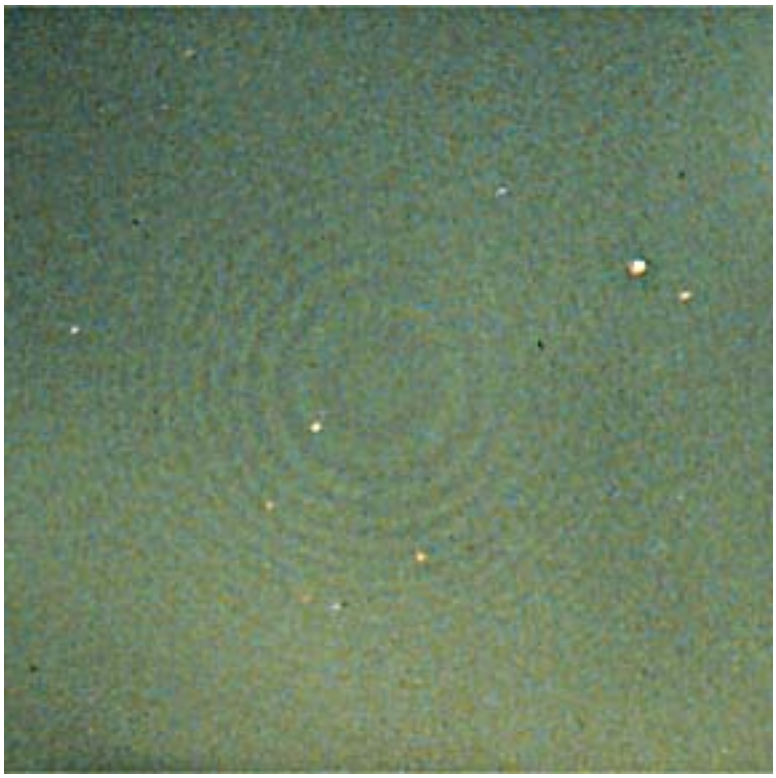

**To The Kenai Peninsula Eagle Press**

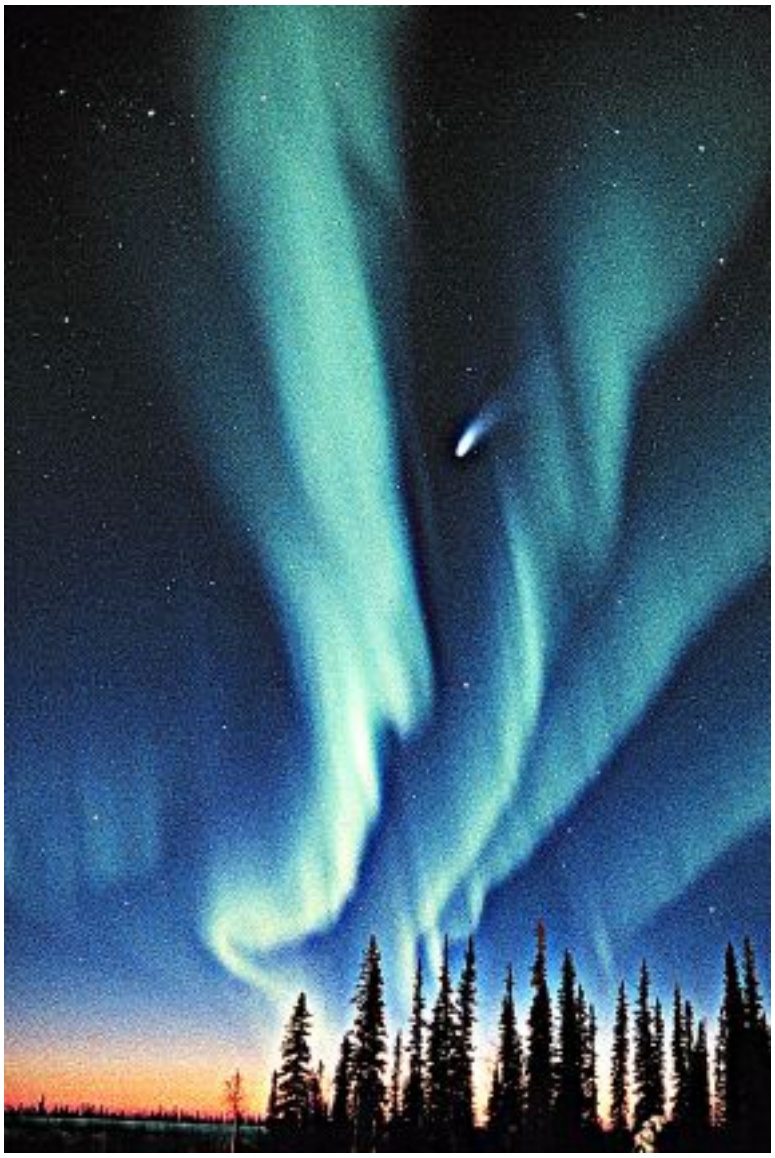
**To Alaska Travel Photo**


Made in Alaska




December Sunrise & Sunset in Circle
15 Minute Intervals






3/26/97
by hutch

# April 5, 2000

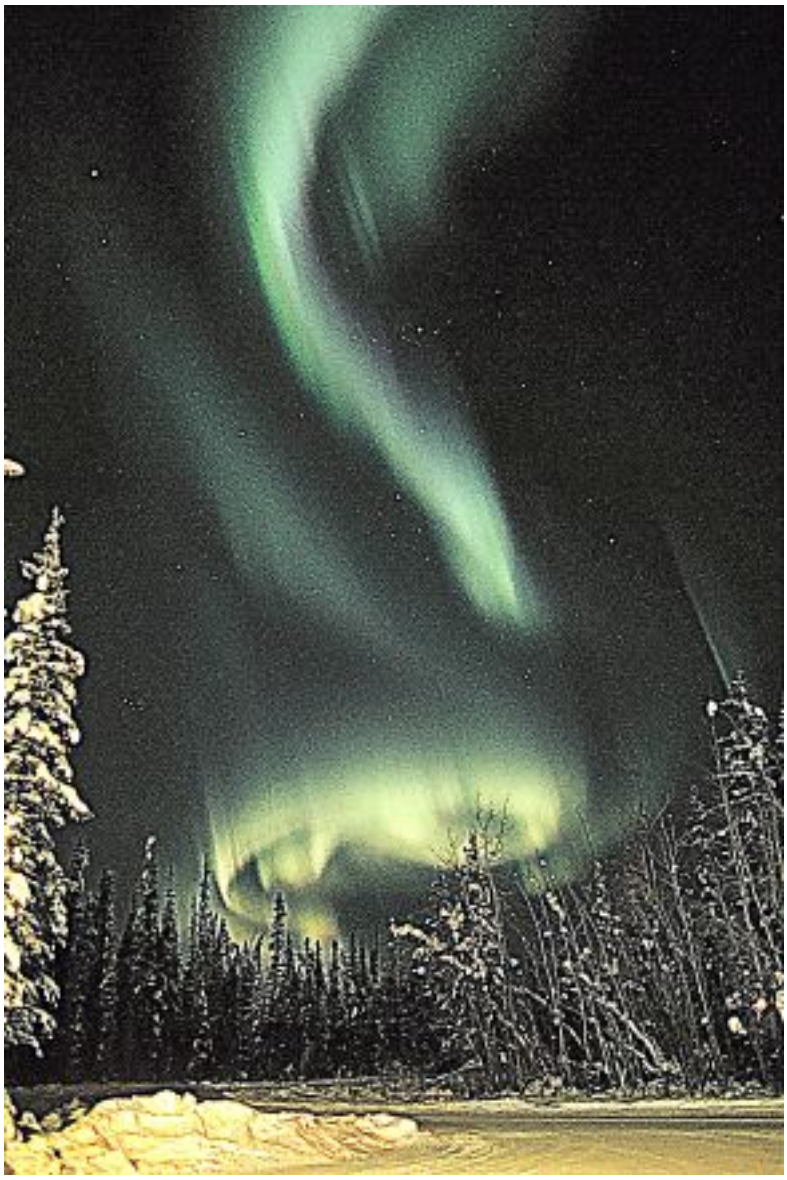
**This gif consists of 35 3-second exposures. The storm was seen by many people north of 40 degrees.**


Wooldridge

**This scene is looking directly overhead and was made from 36 2 second exposures on 35mm film. Actual time is 84 seconds. Using the lower altitudes of the aurora, this would cover approximately 75 miles.**

# March 11,1998

**This gif consists of 13 2-second exposures. The reason for the light change in the foreground and on trees is the rotating beacon flashing 1 white and 1 green light.**




9/3/97
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