



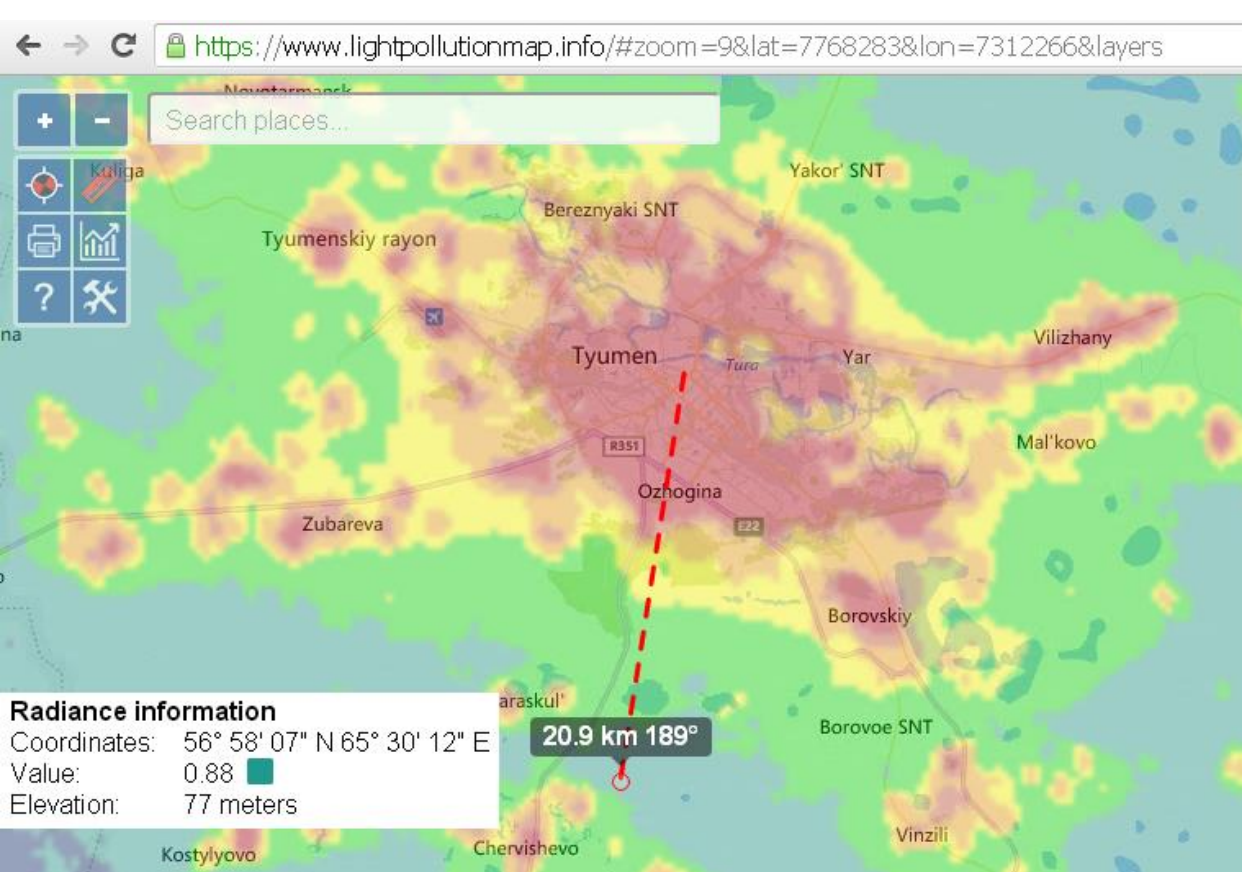
Low-cost setup using a night vision device for video recording of faint meteors

Oleg Tarasov, Kirill Moskvina

School of Physics and Mathematics of Tyumen Region, Russia



Disassembled and assembled setup



Light pollution map at the watchpoint (forest in 21 km from Tyumen).

1. The setup for faint meteors video fixing is built based on the Canon EOS 1300 D digital camera, the PN21K night vision device (2+ generation, light gain 2500 times, field of view 40 degrees) and the Microstage II adapter.

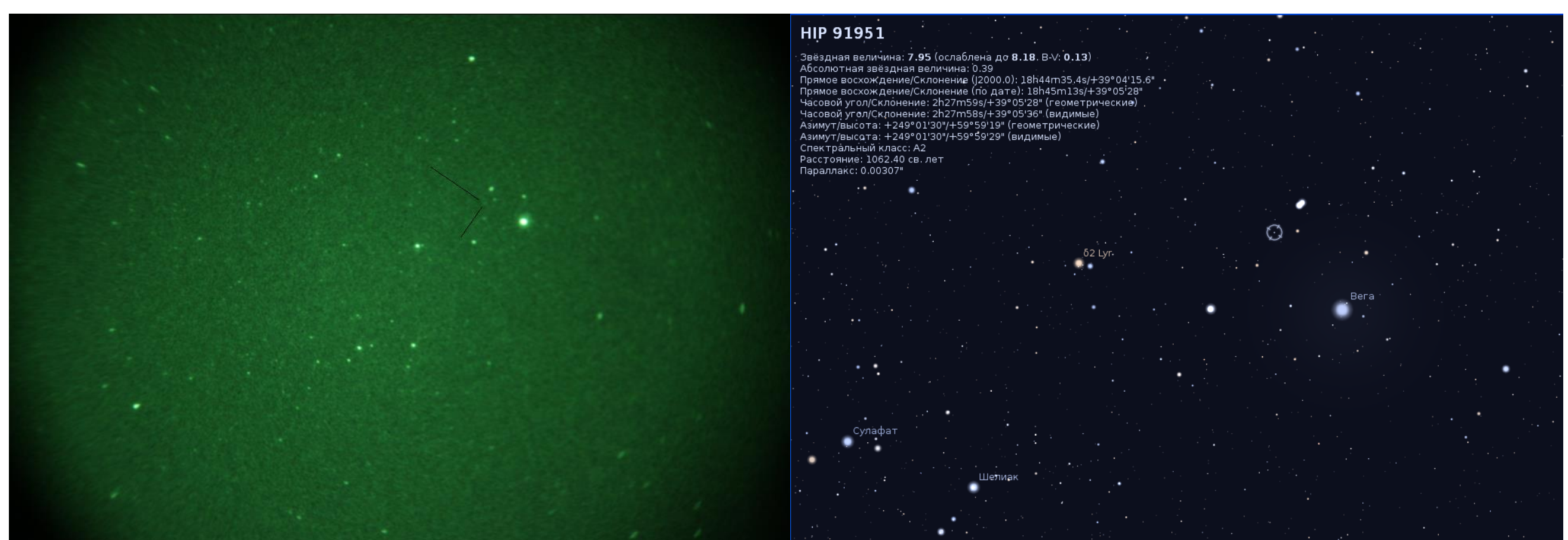
2. The setup field of view was 20 degrees, and the equivalent ISO was 16 million. The actual ISO was several times lower, because the night vision device reduces the gain in the presence of light pollution of sky.

3. Under the conditions of the "green zone" (5 degrees on the Bortl scale), the light penetration as +8 for stars and + 5 for meteors was obtained. The estimation for extremely dark skies (1 Bortl scale) gives the light penetration for meteor of +7 magnitude, i.e. under ideal conditions, telescopic meteors will be visible via our setup.

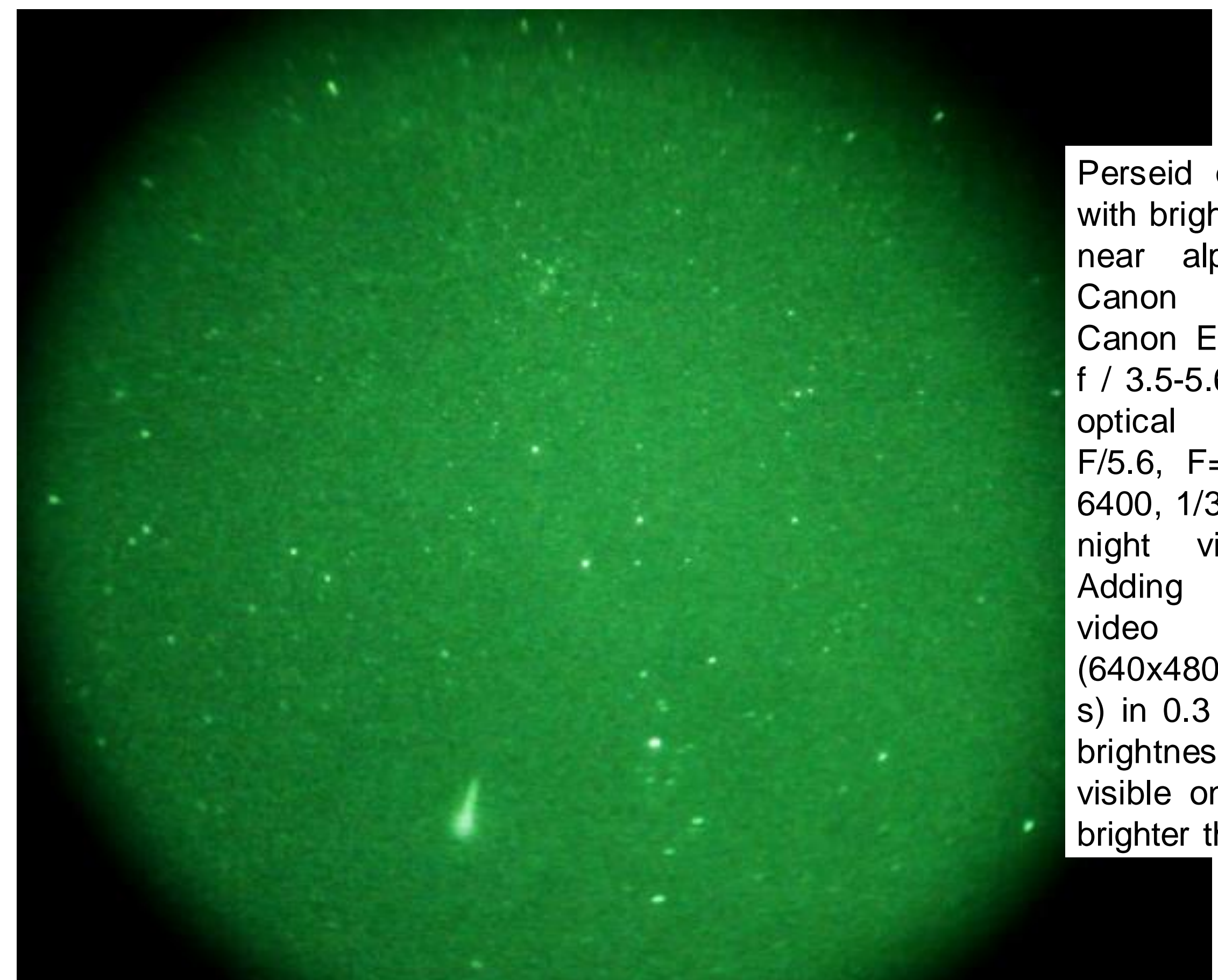
4. Tests near the maximum of Perseid 2018 demonstrate that the setup captures up to 10 meteors per hour with a field of view of 20 degrees, which is 4-10 times more effective than meteor photo and video cameras in terms of their field.

5. The cost of setup was 1700 USD. It is from 2 to 10 times less than analogues of Sony A7S II and Canon ME20F-SH with the best ISO characteristics.

6. Due to the relatively low cost, simplicity and availability of components, such an setup is available to individual astronomy enthusiasts and astronomical circles, which allows us to hope for the future widespread use of such solutions in the practice of Amateur astronomy



Estimation of the setup light power by stars. Photo of the Lyra constellation via our setup. Selected star HIP 91951 (+8). The same section in the Stellarium program.



Perseid of 07.08.2018 with brightness of + 1.5, near alpha Perseus. Canon EOS 1300D, Canon EF-S 18-55mm f / 3.5-5.6 IS II without optical stabilization, F/5.6, F=36 mm, ISO 6400, 1/30 with PN21K night vision device. Adding 7 frames of video recording (640x480, 25 frames / s) in 0.3 seconds. The brightness of the stars visible on the frame is brighter than +7.1.