

TLE remote camera Idea and concept

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10. Meteor-Meeting, 12.10.2019, Bellinzona



Why a remote camera? Clouds!



2016/09/14 22:40:10.461 (UTC) 0146

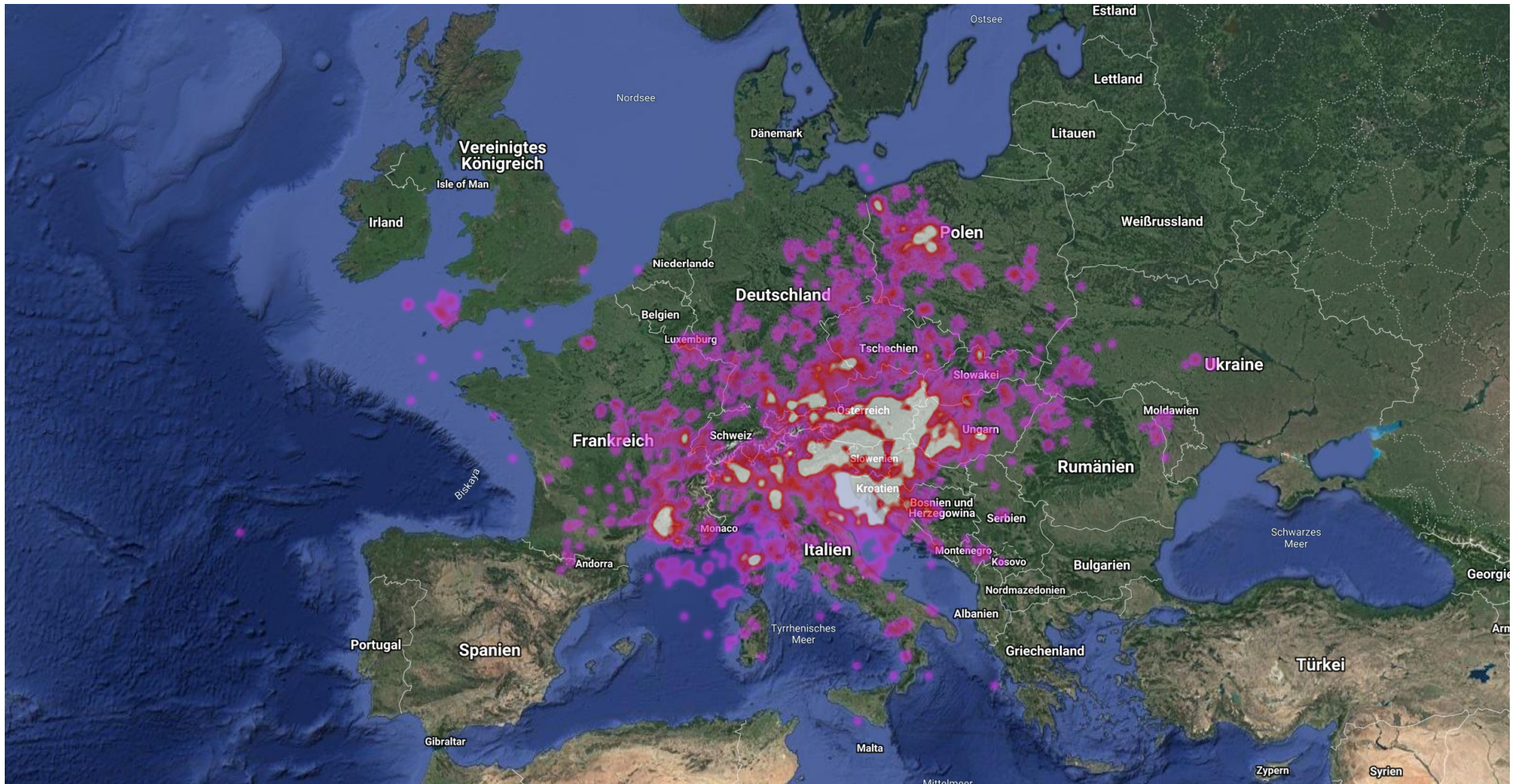
V00009+043

|| Sony_a7sII Samyang_85mm_f/1.4 | www.ogvt.org | VTE-8

Why a remote camera? Hills!



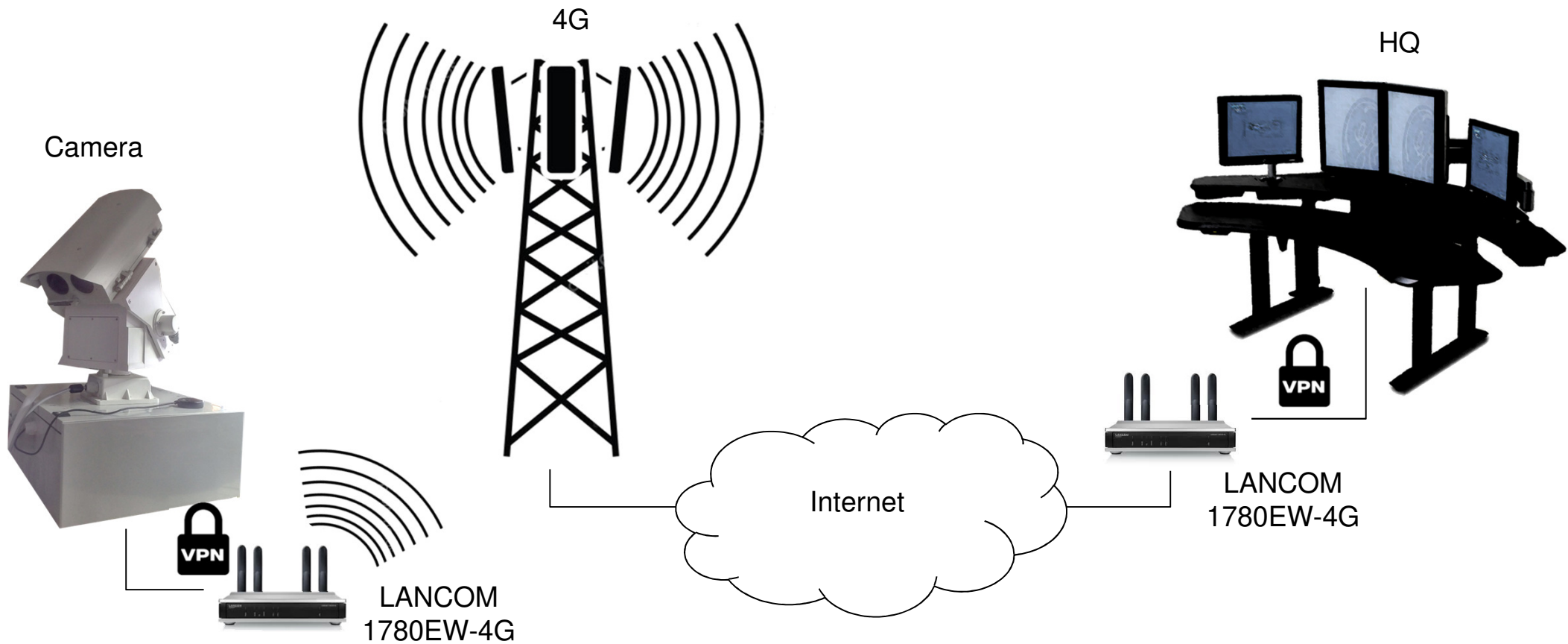
Why a remote camera? Location!



The basic idea

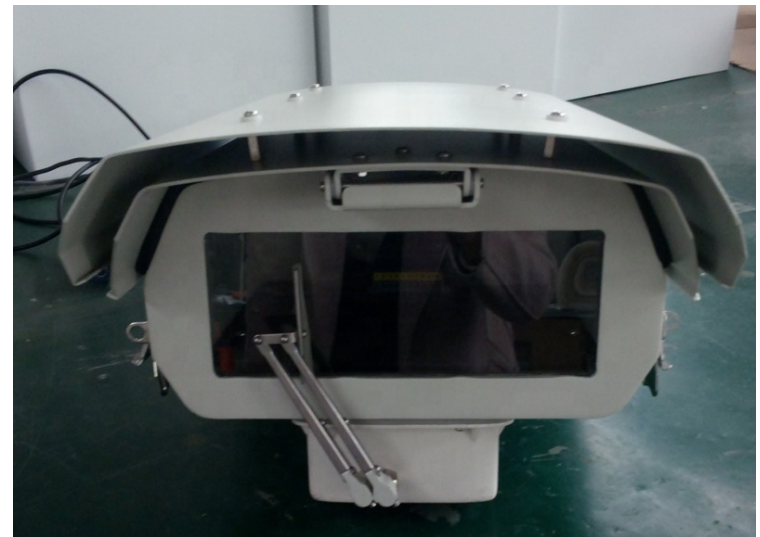
- Location south of the Alps
(possible thanks to Stefano)
- Movable camera
- Local recording
- Permanently online
- As autonomous as possible

The Concept



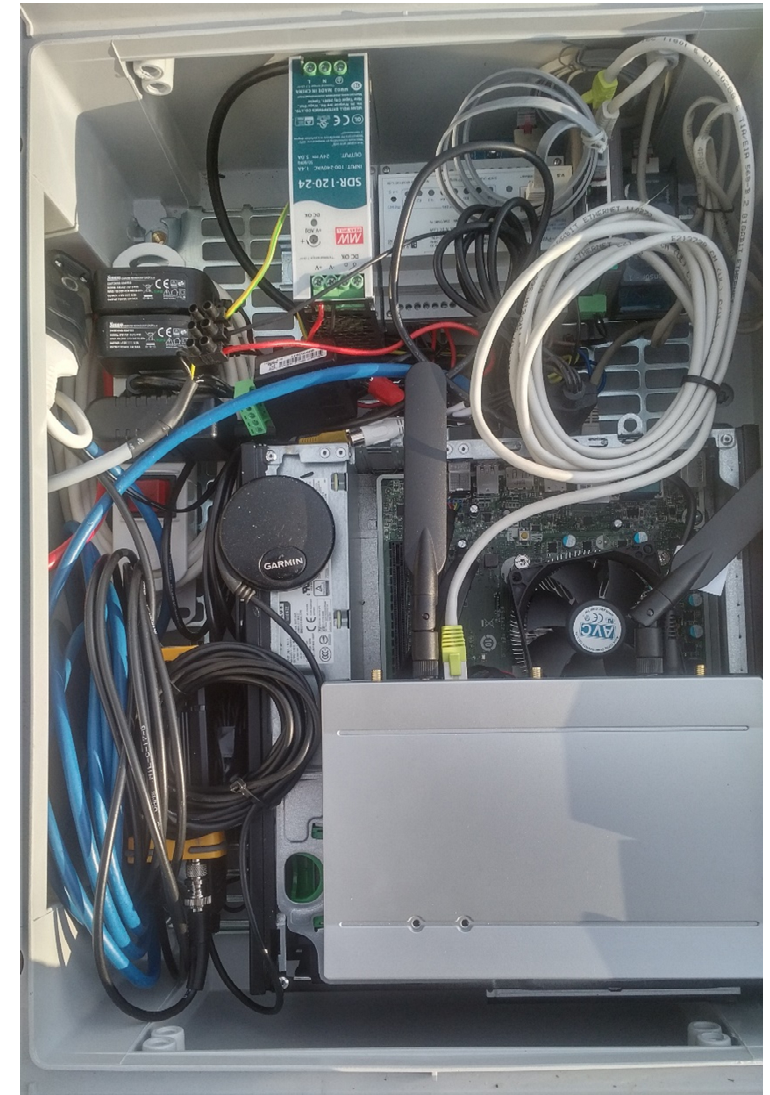
Camera module

- PTZ
- Housing (ventilated, heated, windscreen wiper)
- Cameras and lenses
- spectroscopy grating

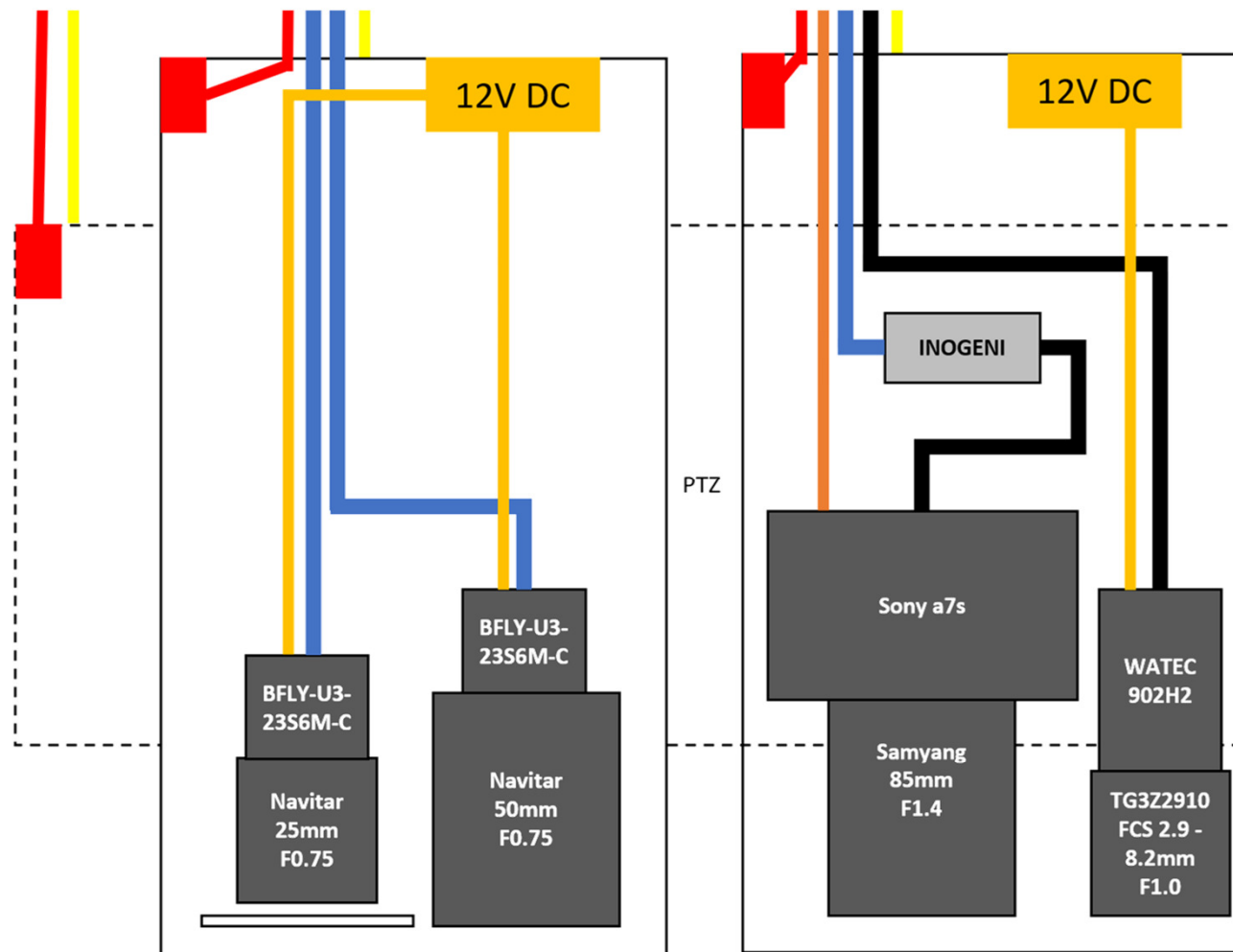


The basic module

- LTE router (4G)
- NET-PwrCtrl + Sensor
- switch
- 2 computers
- TIM Video Time Inserter
- AC/DC power supply
- UPS



The Cameras



Safety and Automation

Potential source of failure	solution approach
Internet connection is lost	Keepalive Timer in LanCom, reboot Router
Router no longer reachable	Keepalive Timer in NET-PwrCtrl, Power off / on and thus reboot router
Malfunction in individual component	The power supply to all important system components is manually controllable.
Camera position at dawn	Batch script, automatic alignment of PTZ to north at daybreak
Camera position in case of power failure	UPS supply, voltage test via NET-PwrCtrl HUT
Alignment and Orientation	Fix programmed waypoints at 15 degree distance
Remote access to computers	Redundant systems (TeamViewer, AnyDesk, ThinVNC, RDP)

Outlook

- Assembly final configuration
- sun shield
- isolation
- protection against vandalism
- outdoor tests
- Analysis of temperature and humidity curve
- Initial images spectrum (laser)
- commissioning



Learnings

- Agile project management is stupid and expensive and takes ages ;-)
- Mobile support for IoT projects is not yet developed and expensive (public IP, DynDNS).
- VPN over 4G is ambitious
- Purchasing in China is challenging (companies, communication, holidays, ...)
- Such a project is teamwork: Thank you Jochen & Stefano & Gabriela!

Fachgruppe Meteorastronomie

Thank you



Appendix

- Links to components

Links to components

Component	Link
PTZ & housing	Hebei Henghui Minghui Science And Technology Co., Ltd. http://www.chinasecurityproducts.com/ Shenzhen Sowze Security Electronic Co.,Ltd http://www.sowze.net
Cameras	FLIR Systems, Inc. https://www.flir.com/products/blackfly-usb3?model=BFLY-U3-23S6M-C Watec Co., Ltd. https://www.watec.com/English/e_mono.html Sony Europe B.V. https://www.sony.ch/de/electronics/wechselobjektivCameras/ilce-7s
Spectroscopy	Edmund Optics https://www.edmundoptics.com/p/600-grooves-25mm-sq-287deg-blaze-angle-grating/10093/

Links to components

Component	Link
Lenses	Navitar Inc. https://navitar.com / https://www.ebay.com Samyang Optics https://www.samyanglensglobal.com / https://www.ebay.com Computar CBC AMERICA LLC https://computar.com / https://www.ebay.com
NET-PwrCtrl	ANEL-Elektronik AG https://de.anel.eu/index.htm
LANCOM 1780EW-4G	LANCOM Systems GmbH https://www.lancom-systems.de
Inogeni 4K2USB3	INOGENI https://inogeni.com/product/4k-to-usb-3