



Croatian Meteor Network: ongoing work 2014-2015

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Introduction

CMN coverage

Software updates

Orbit catalogues updates

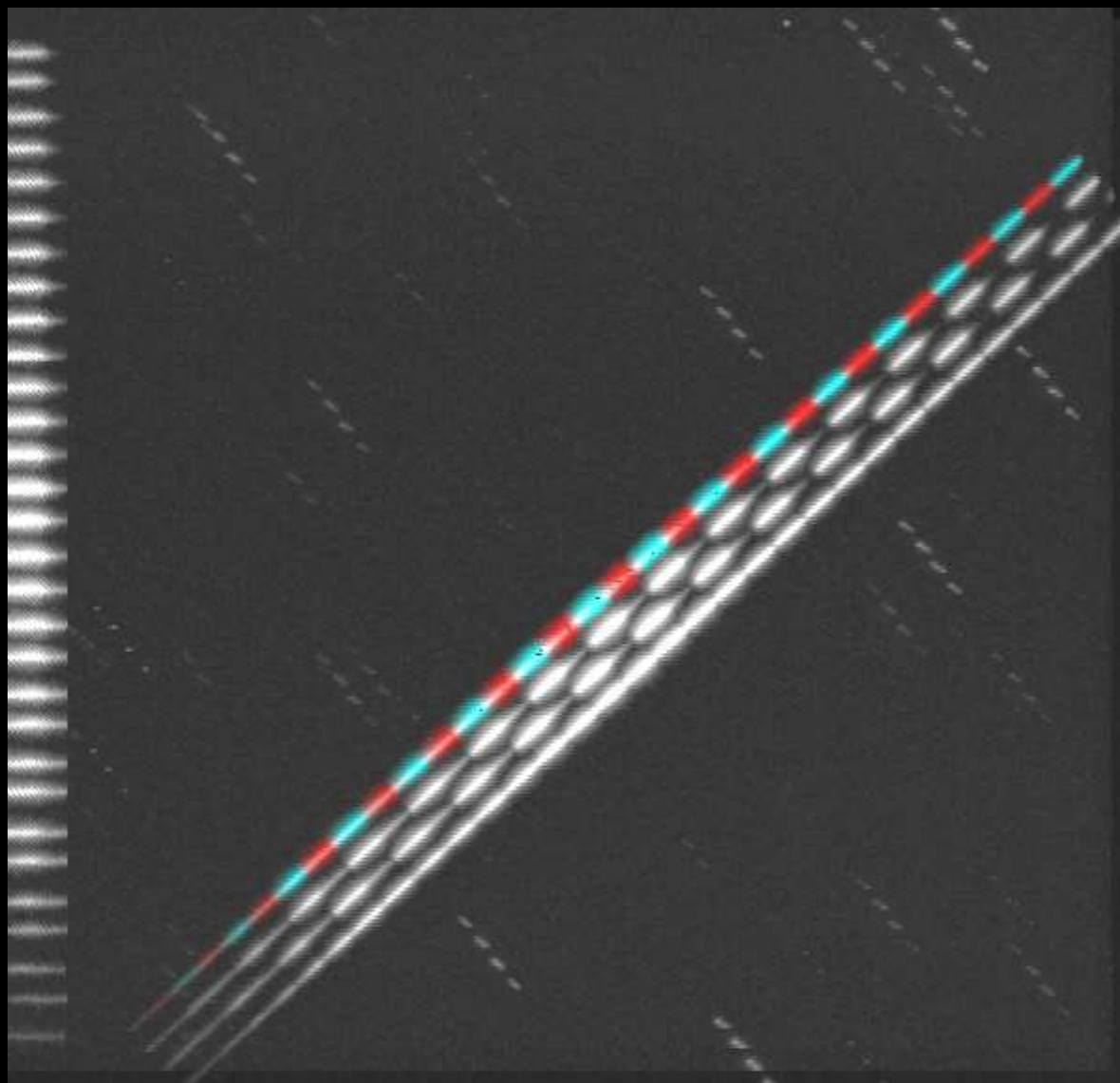
Shower search updates

International colaboration

New fields of research

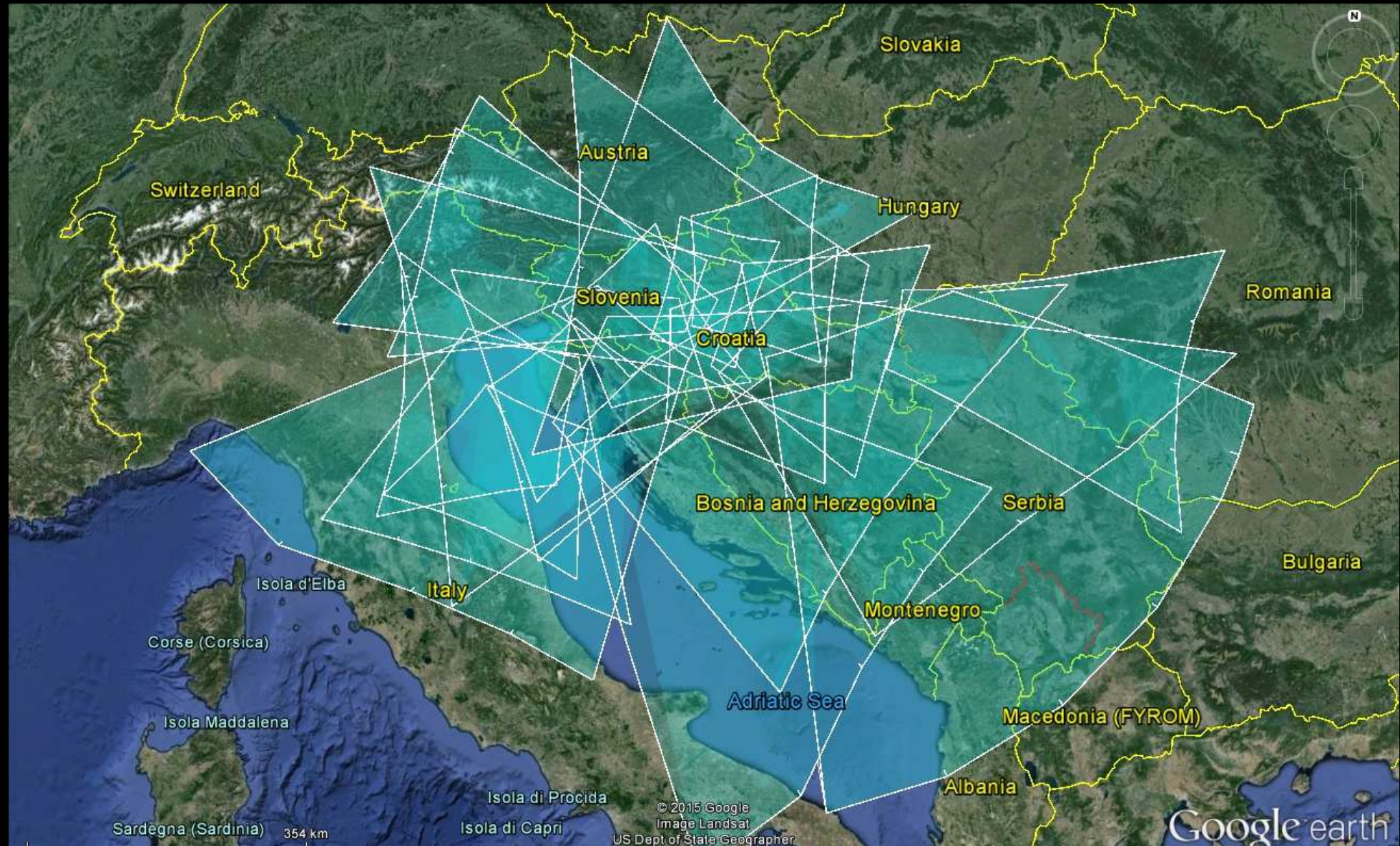
Education

Summary



CMN coverage 2015. @100km

- Number of active cameras: 21; hardware issues (-\$,€,...)



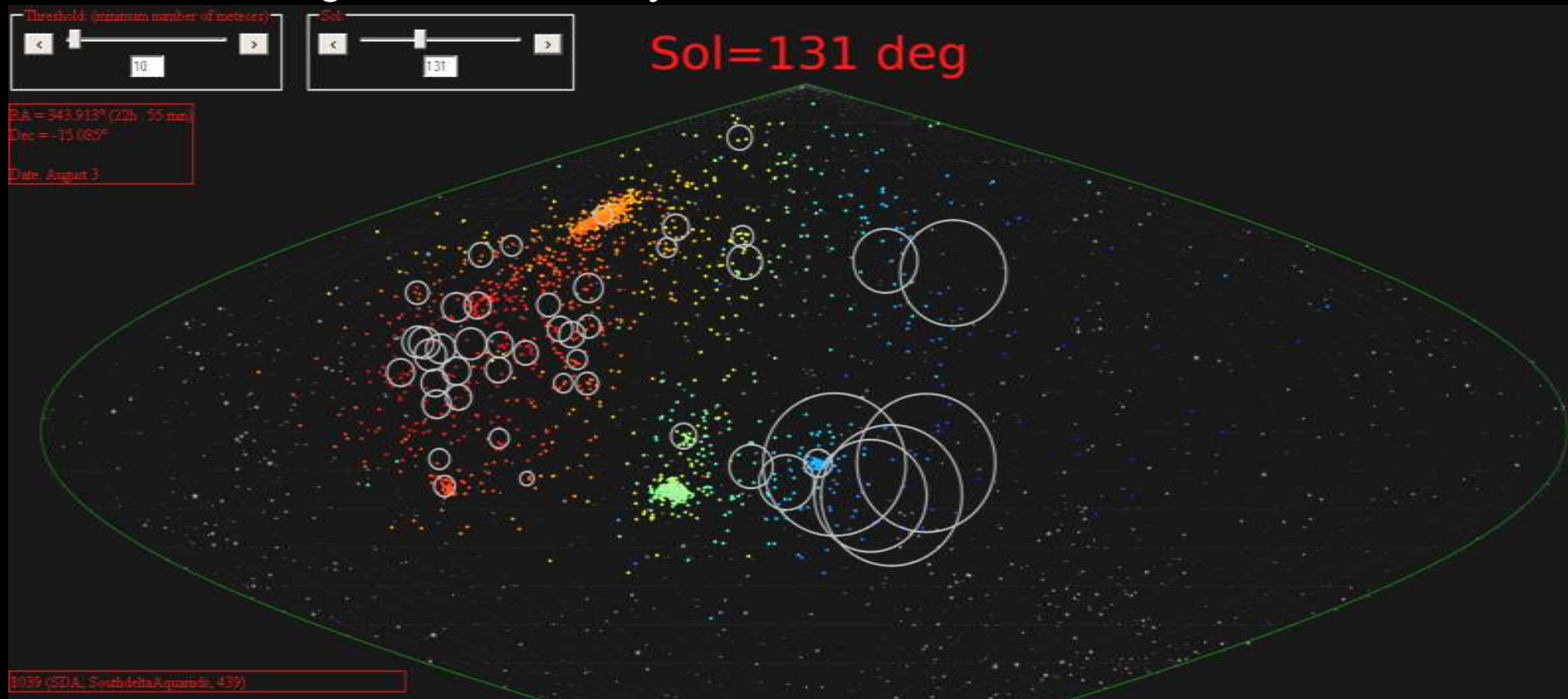
CMN coverage 2015. @20km

- to be done: improve coverage @20km, restore southern CMN coverage



CMN Software updates

- ADAPT – more than one year running, very satisfied
- 9 stations migrated from SkyPatrol to CAMS



- To be done: “Shower Atlas” – web based radiant / showers visualization; daily radiant plots (NASA web-like)

CMN Software updates

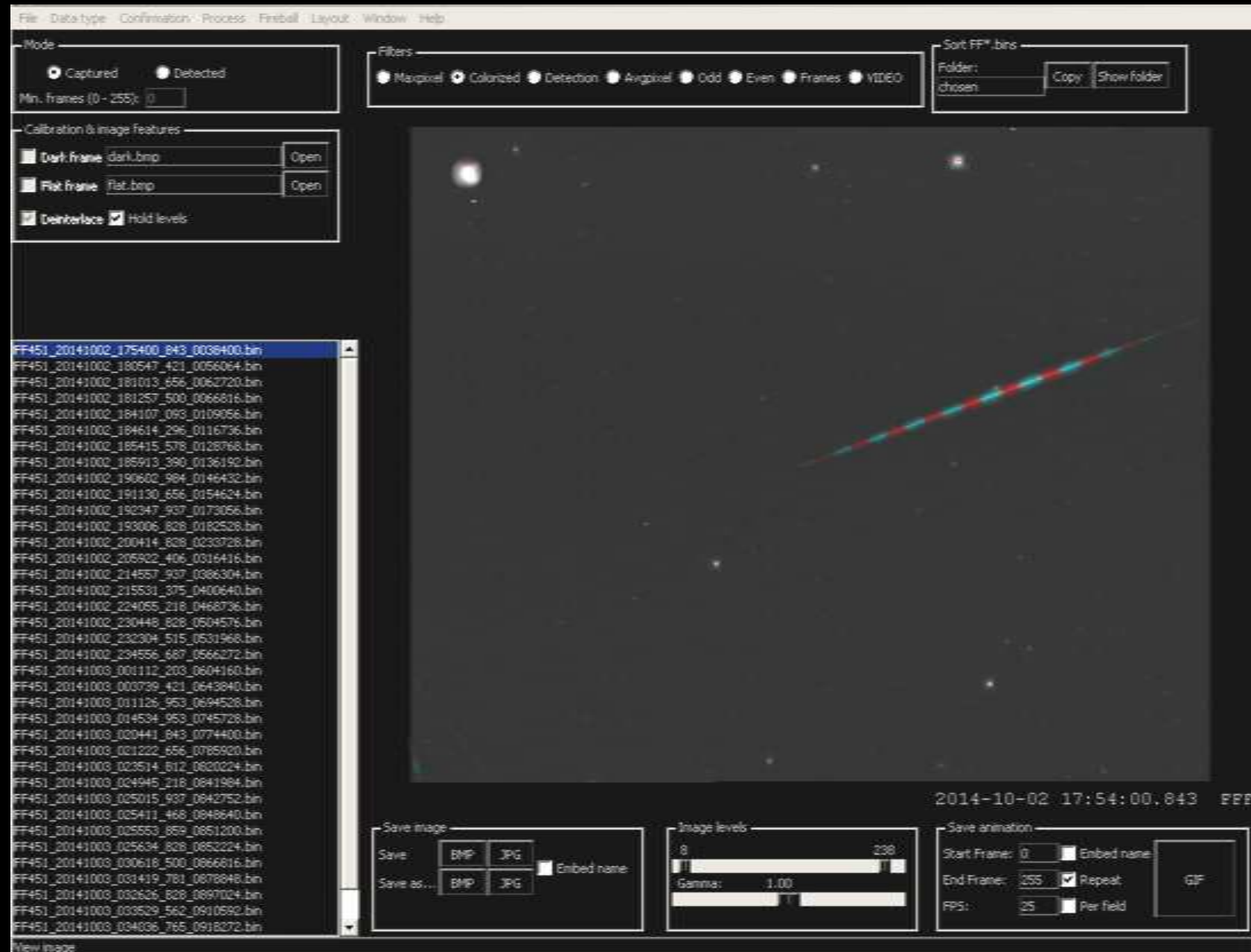
- CMN_BinViewer:

→ done

- Very satisfied
CAMS users

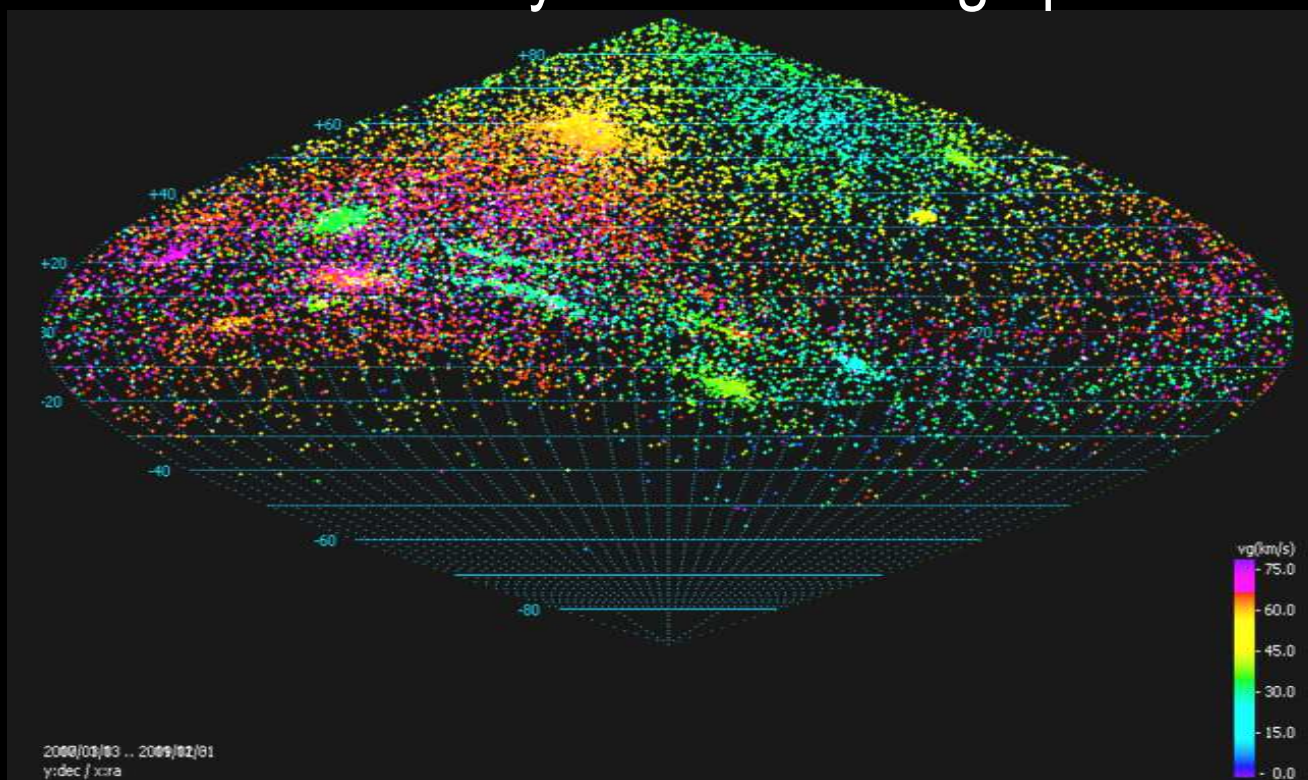
- Confirmation
option available

- Supports
SkyPatrol as well



CMN orbit catalogues updates

- Data processed up to 2015.
- Only one station remained in un-automated detection mode
- Catalogues for 2013. and 2014 – during 2015.
- “Up to date” at last - after 8 years of catching up



- To be done: automated daily / monthly reports, plots, stats...

CMN Shower Search updates

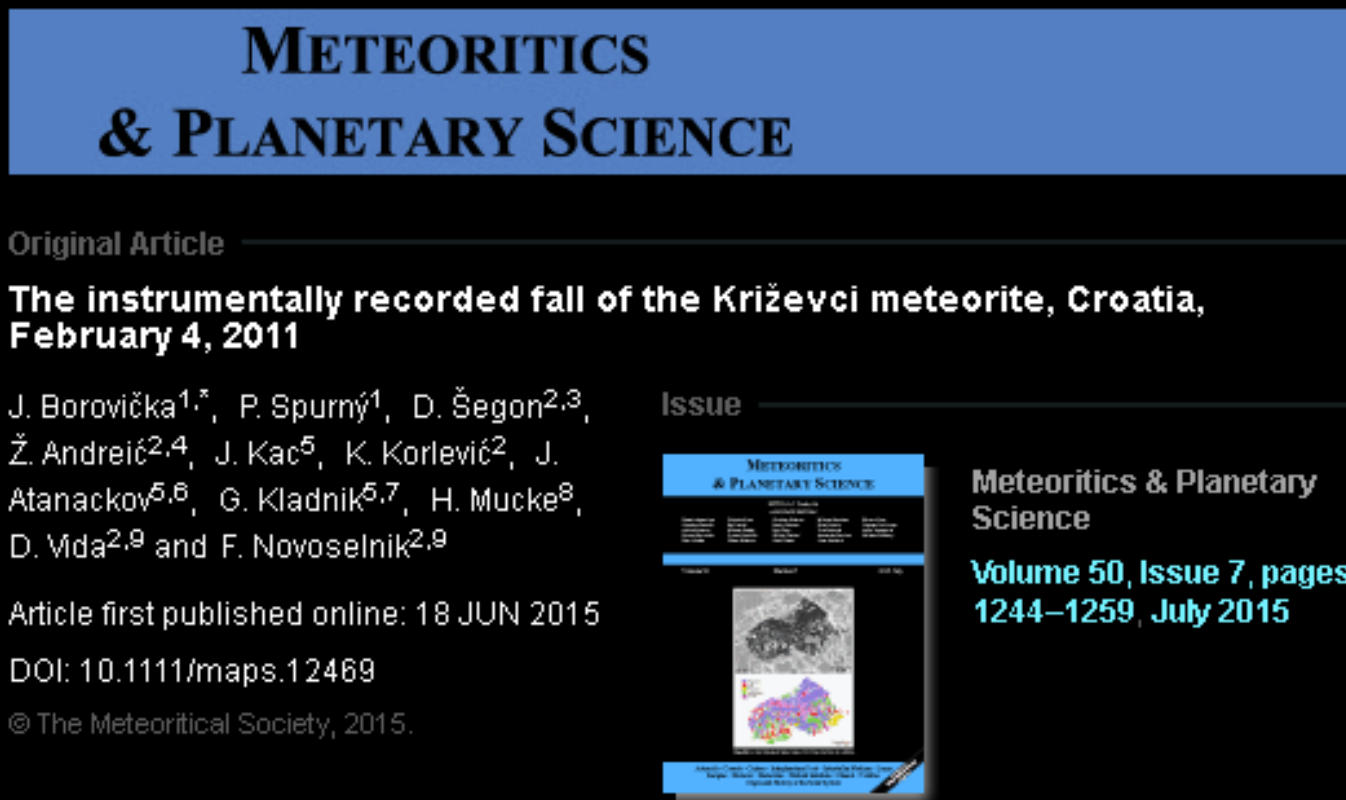
- From 444ZCS to 755MID, more than 100 possible new showers
- Main search on 2013.
- 20 new showers proposed to be established
- 8 parent body / shower associations confirmed (Vaubailon)

00510	JRC	June rho Cygnids	00520	MBC	May beta Capricornids	00531	GAQ	gamma Aquilids
00511	FLY	15 Lyncids	00522	SAP	Southern alpha Pegasids	00532	MLD	May lambda Draconids
00512	RPU	rho Puppids	00523	AGC	August gamma Cepheids	00533	JXA	July xi Arietids
00513	EPV	epsilon Virginids	00524	LUM	lambda Ursae Majorids	00534	FOA	51 Andromedids
00514	OMC	omega Capricornids	00525	ICY	iota Cygnids	00535	THC	theta Cetids
00515	OLE	omicron Leonids	00526	SLD	Southern lambda Draconids	00536	FSO	47 Ophiuchids
00516	FMV	February mu Virginids	00527	UUM	upsilon Ursae Majorids	00537	KAU	kappa Aurigids
00517	ALO	April lambda Ophiuchids	00528	JZD	January zeta Draconids	00538	FFA	55 Arietids
00518	AHE	April 102 Herculids	00529	EHY	eta Hydrids	00539	ACP	alpha Cepheids
00519	BAQ	beta Aquariids						

- To be done: search/confirmation on new dataset(s), redefine the procedures and make them available public; search the old literature for new showers

International collaboration and results

- Križevci meteorite paper published

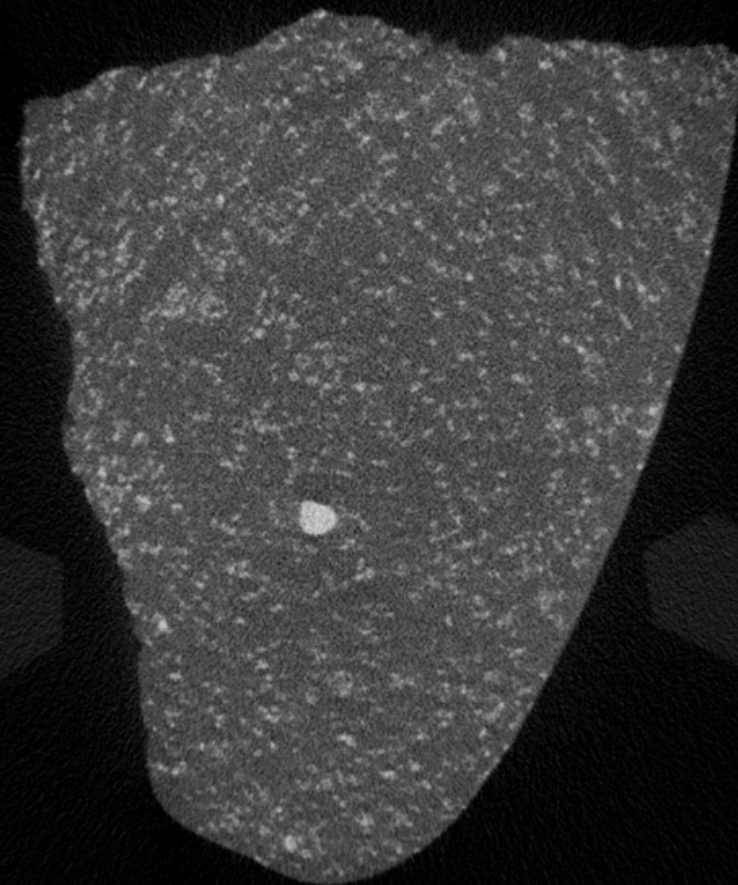
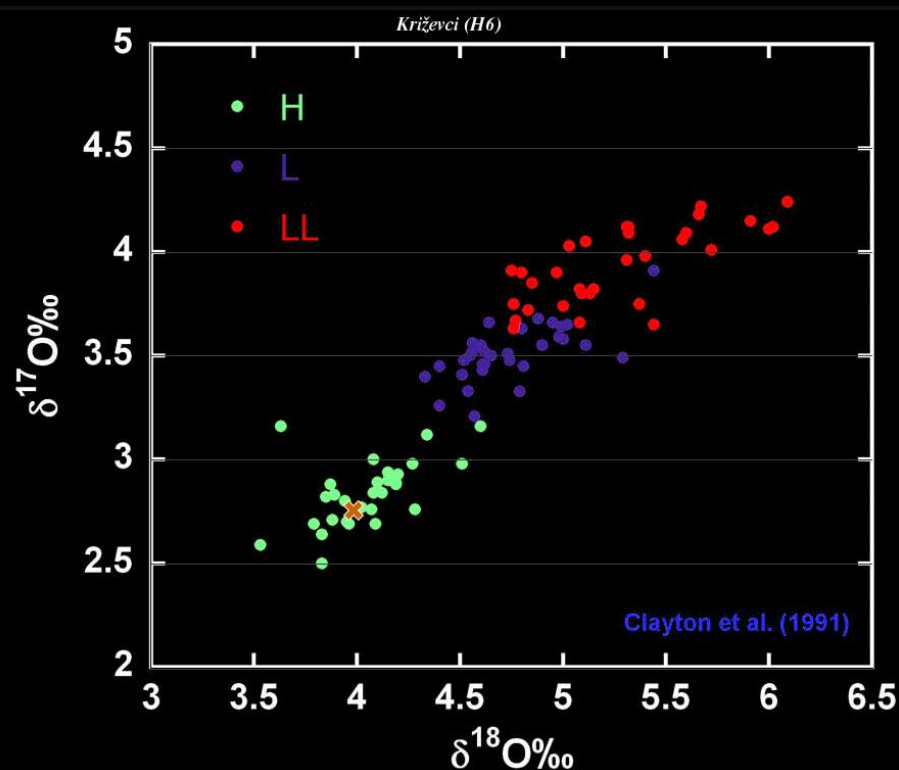


“Križevci can be ranked among the 10 best documented falls.”

“Križevci became the first meteorite recovered on the basis of amateur meteor network.”

International collaboration and results

- Ian Lyon (University of Manchester, UK): meteorite Križevci analysis



77th Annual Meteoritical Society Meeting 2014:

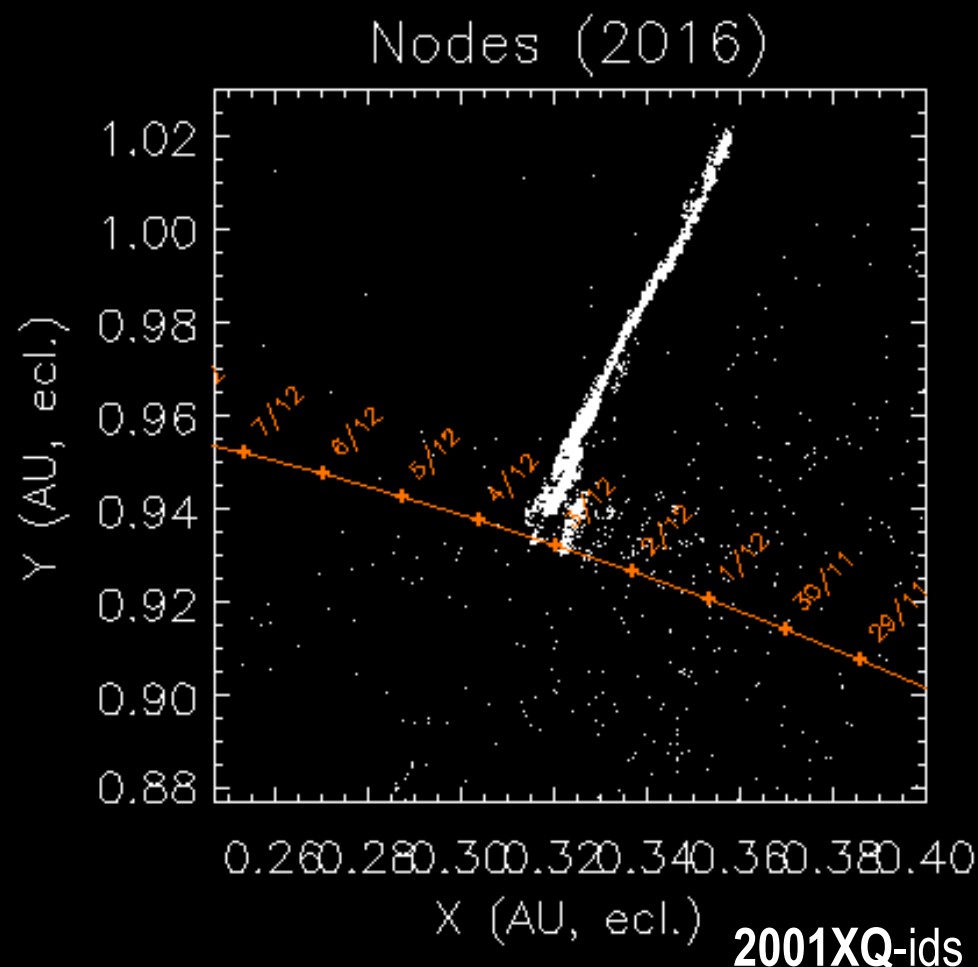
Internal Structure: The stone was analyzed by x-ray tomography to determine the size distribution and relationships between the metal grains. More than 165,000 metal grains larger than 30 μm were catalogued including 6 of large dimension (>5mm) and their spatial relationship to each other. Very few

International collaboration and results

- Jeremie Vaubaillon (IMCCE): dynamical modeling of potential meteor shower association to parent bodies in CMN shower search

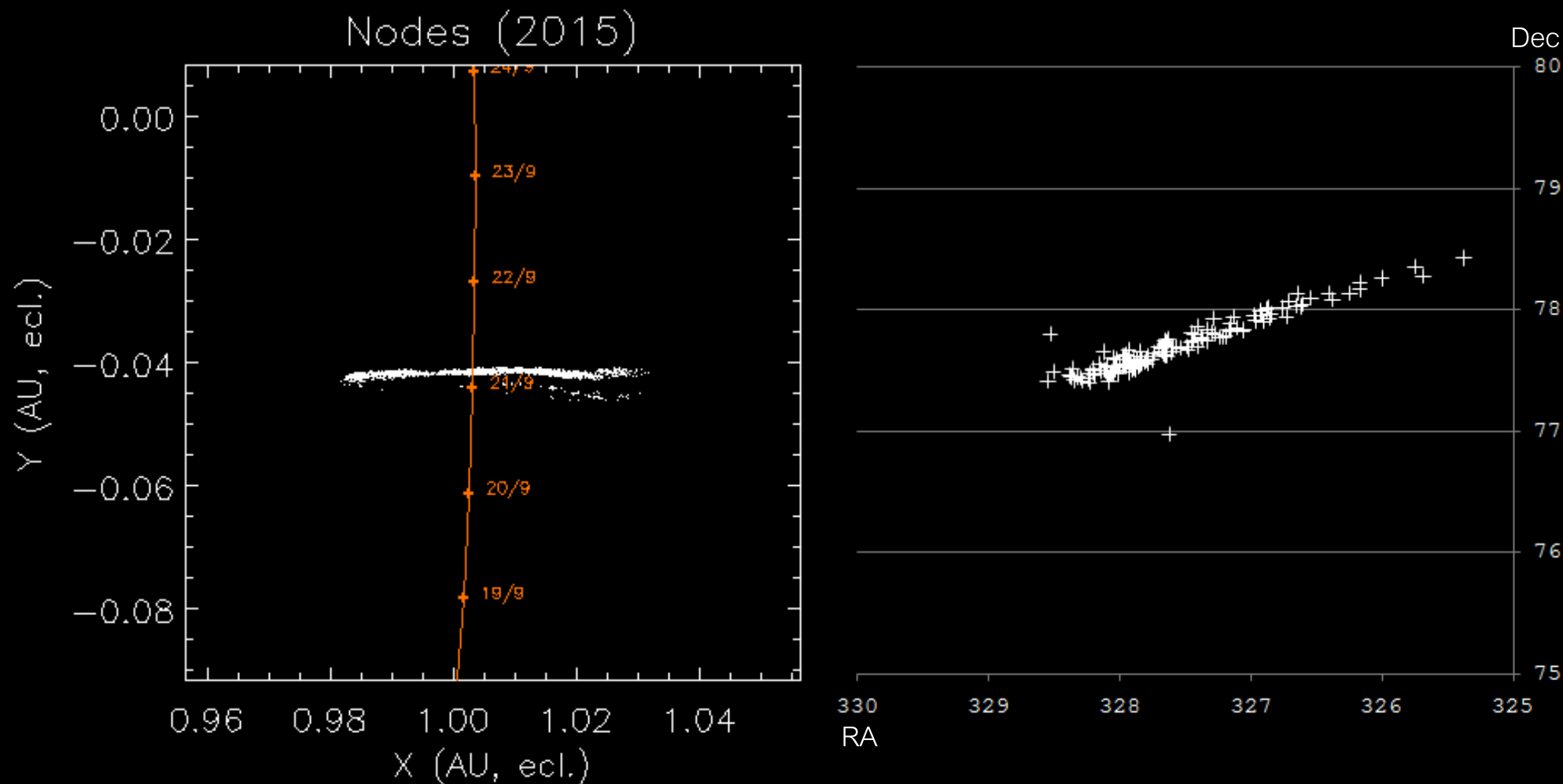
- modeled meteoroids from 8 out of 13 investigated bodies have direct hits into the Earth

- Showers and parent body relationships will be presented in separate papers



International collaboration and results

- Jeremie Vaubaillon (IMCCE): **2006SG18**-ids (751KCE, kappa Cepheids)



September 21st 2015, ~ 03-04h UT

New Fields of Research

- Telescopic meteors: **precise orbits**, light curve analysis
- Camera tests, Sony sensors*: ICX 255, 633, 673 (ExView HAD I/II) and 811 (SuperHAD II) - > ICX673 + Kowa 55mm F/1 lens
- First double station meteor: August the 2nd, 2014.



* **EFFIO** – NOT a sensor, but signal processor chip, see Appendix 1

New Fields of Research

-> 673 + Kowa 55mm/F1

24"/pixel

5.2X3.8°

No vigneting

Stars:

below +10^m

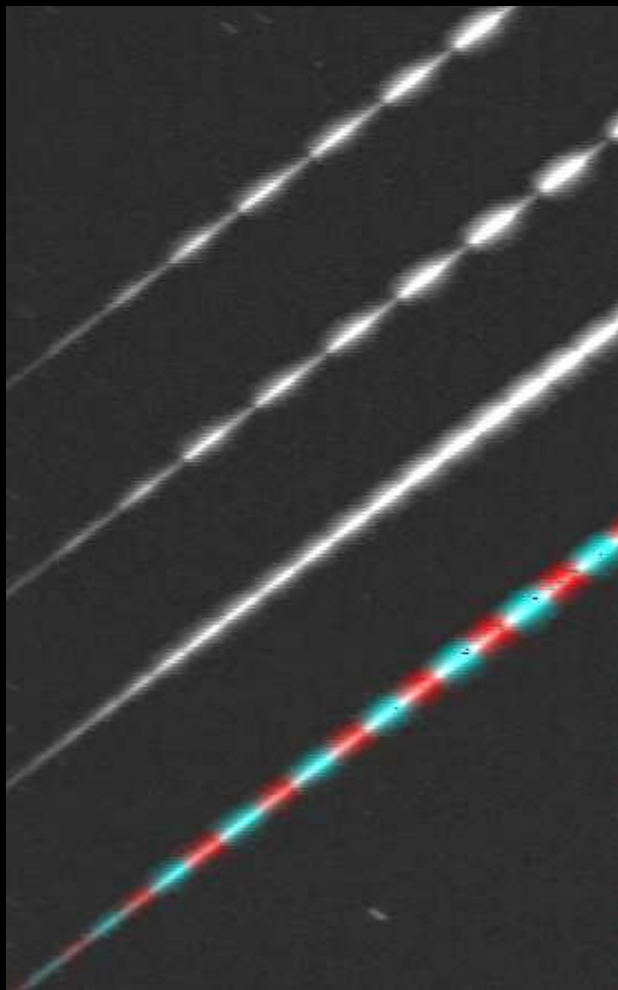
Meteors:

down to +8^m

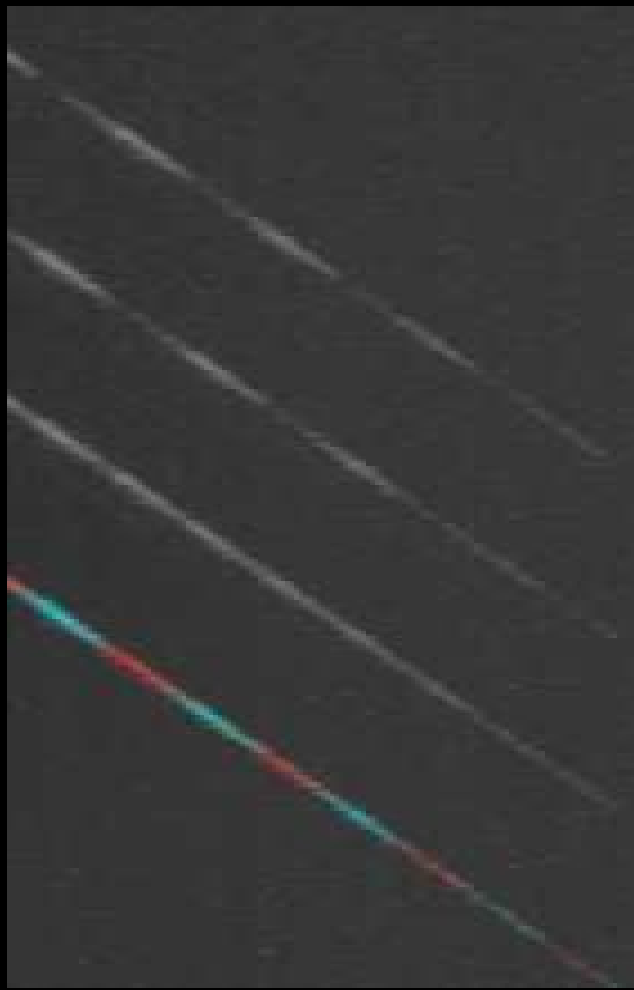


New Fields of Research

- Telescopic meteors – new detection/astrometry approach



wake



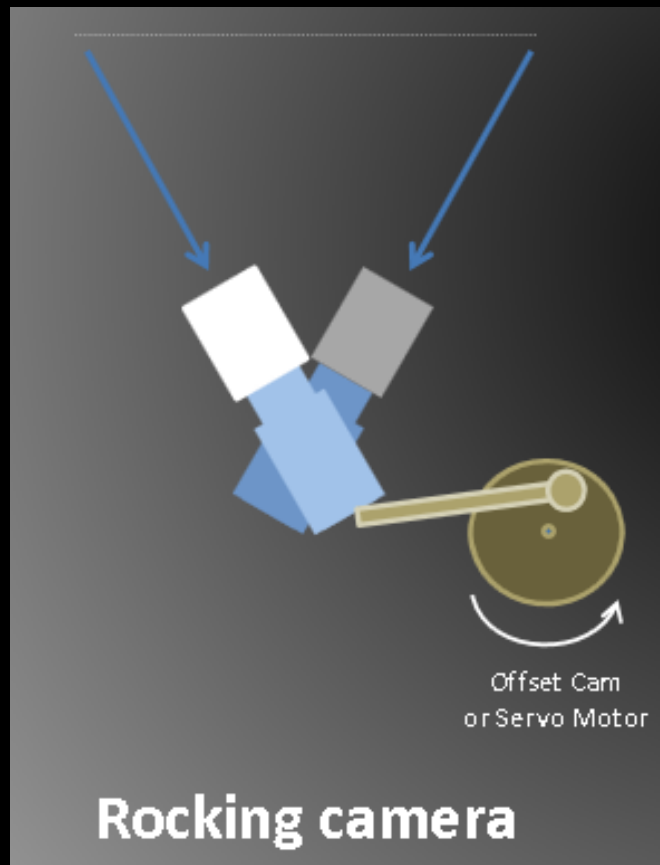
disintegration



faint

New Fields of Research

- “Rocking chair” meteors – wacky project or great opportunity?



Gural, IMC 2014.



Rock' (please don't roll) camera

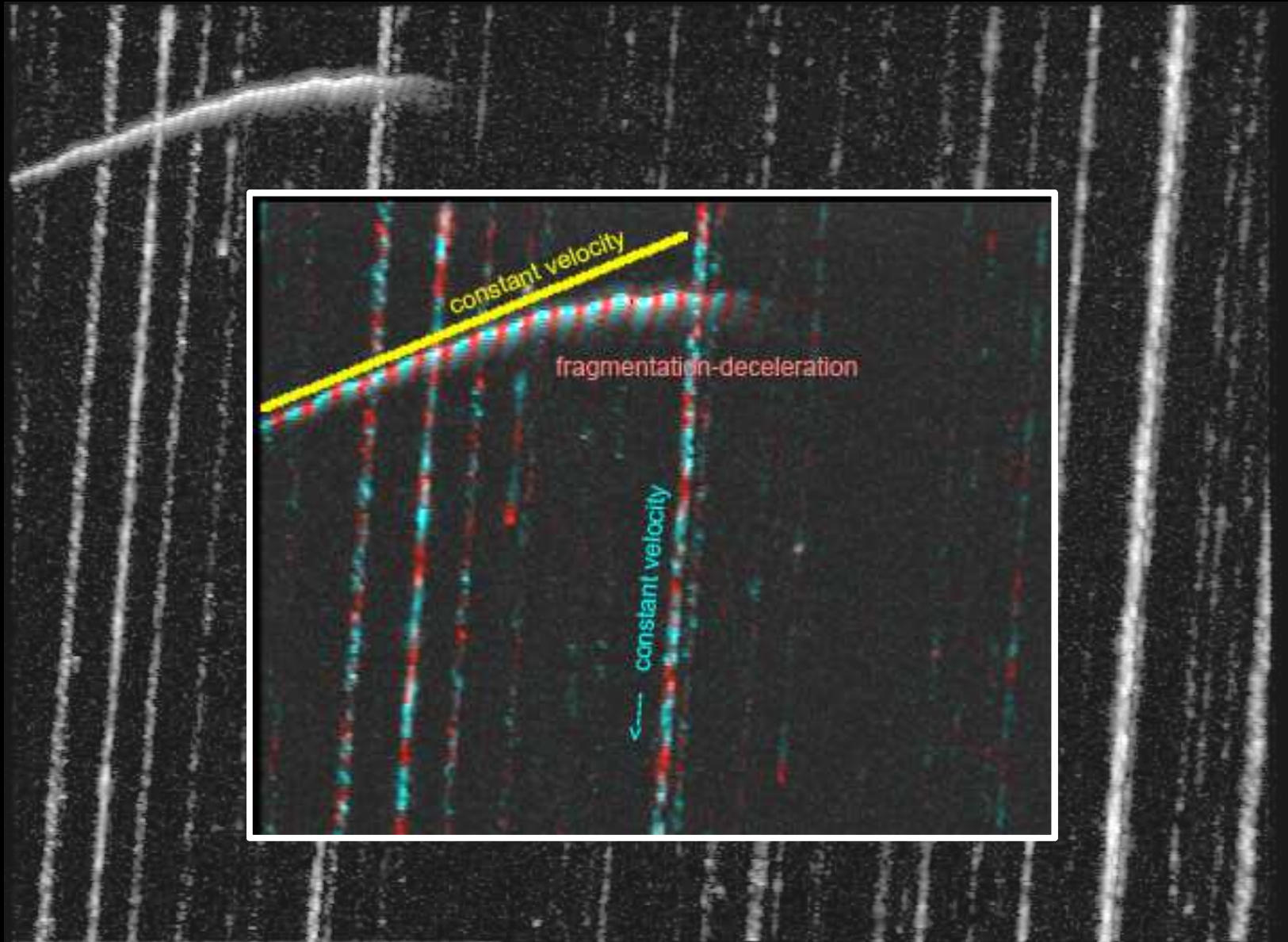
New Fields of Research

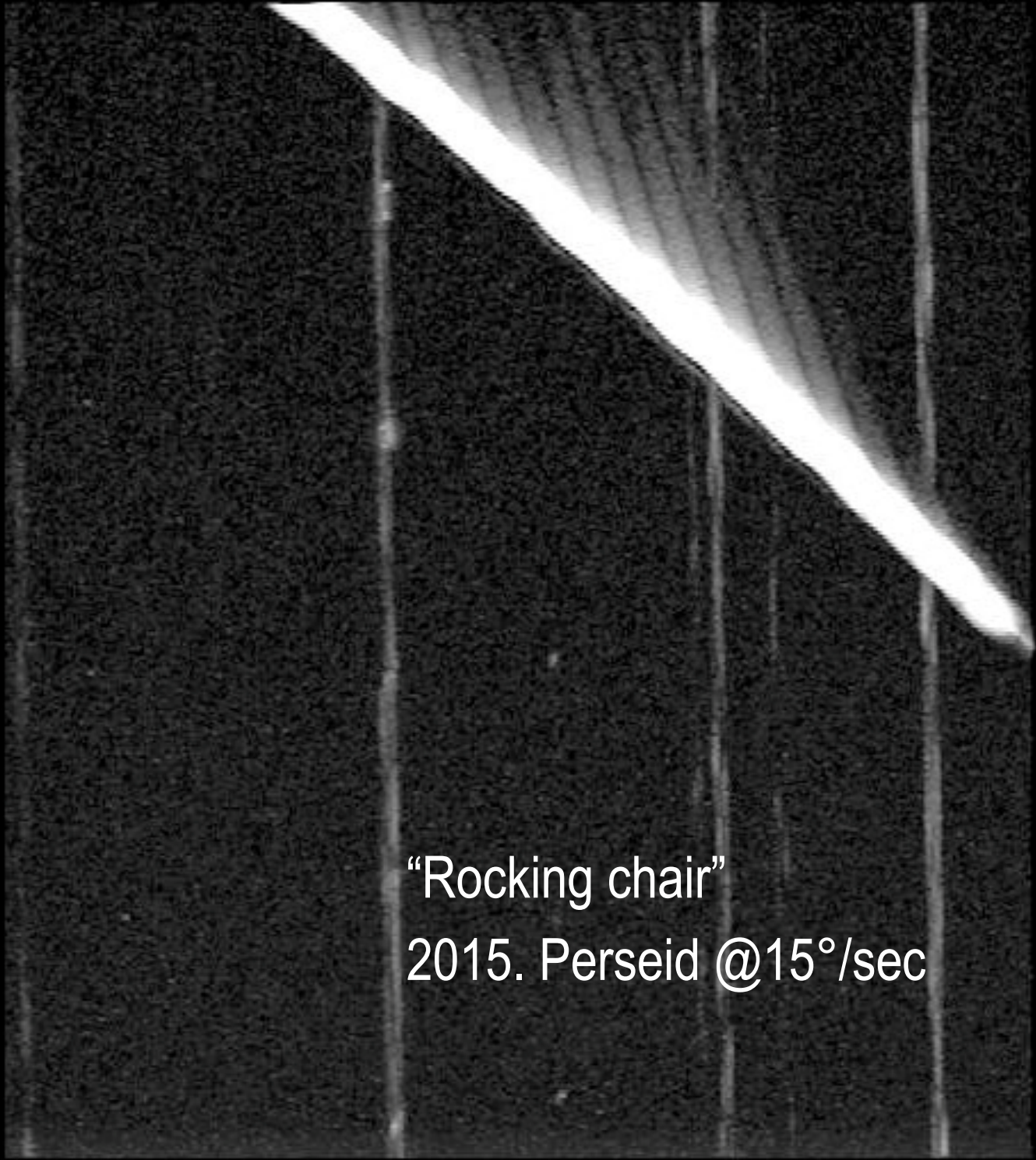
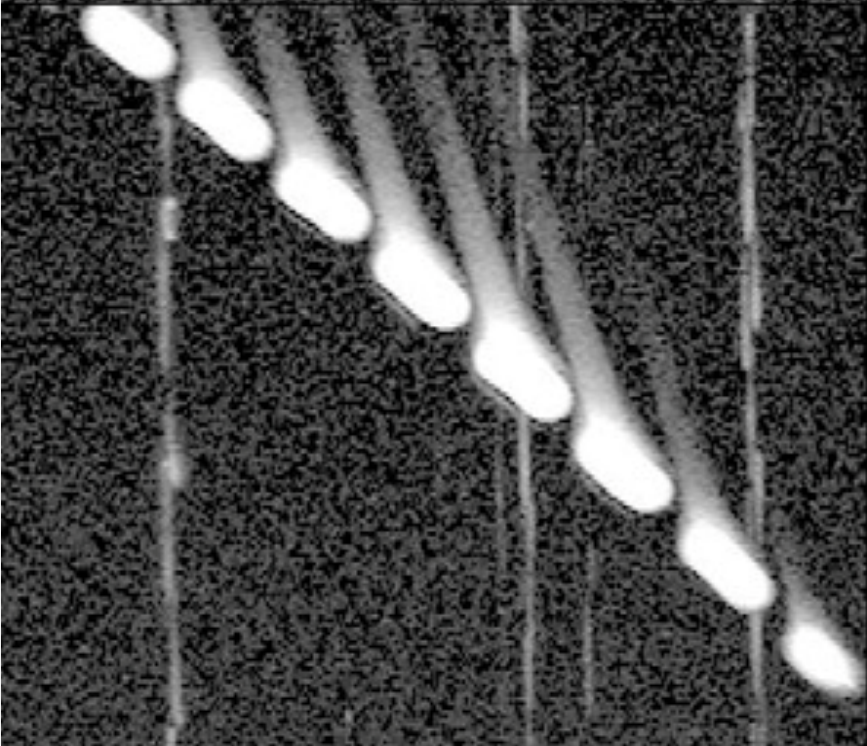
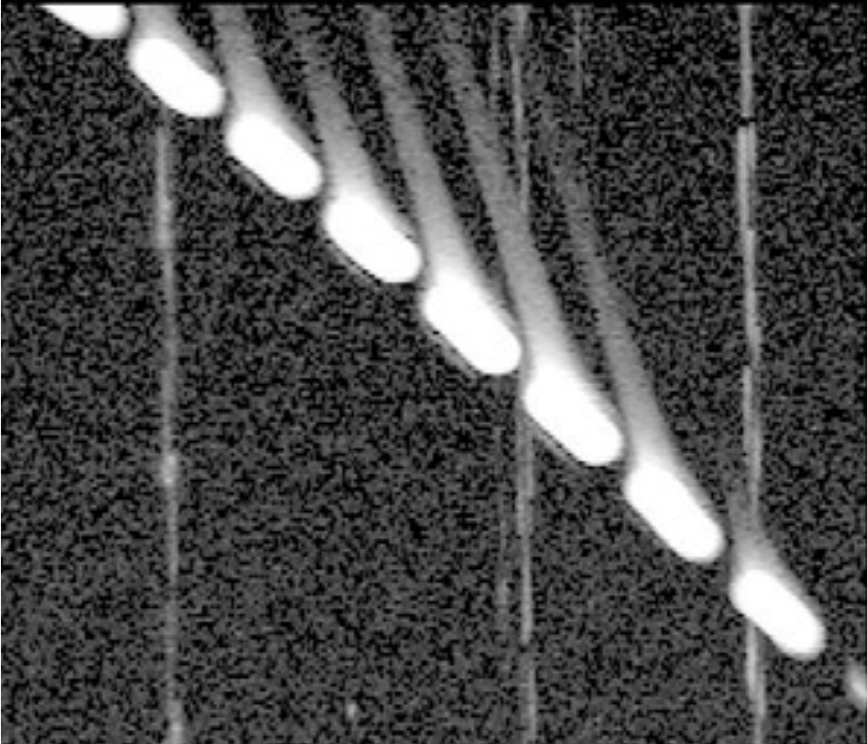
- First meteor captured on 26.12.2014, Kowa 55mmF1, rocking @6°/sec



New Fields of Research

- Wake / disintegration, deceleration!





“Rocking chair”
2015. Perseid @15°/sec

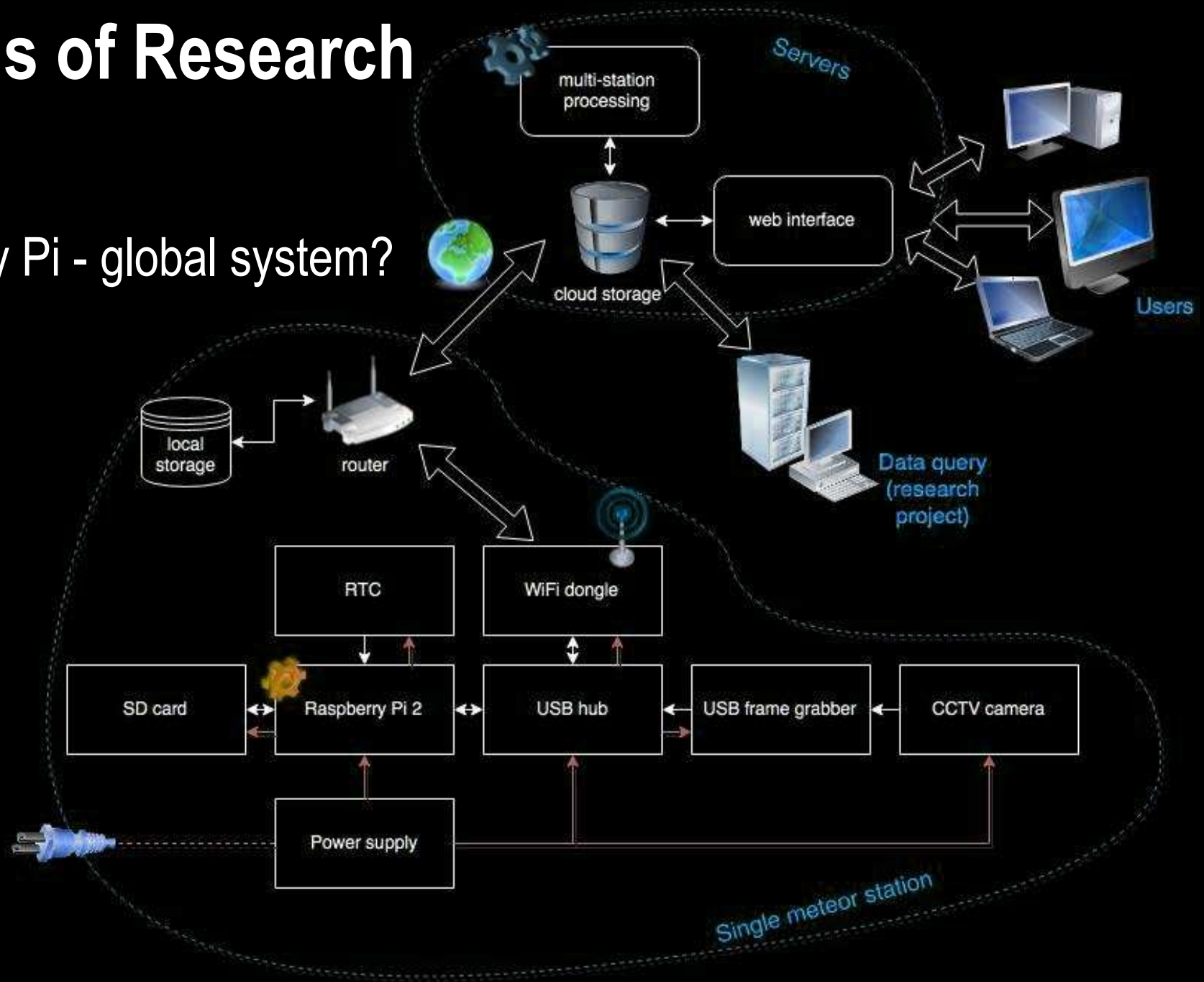
New Fields of Research

- Raspberry Pi based system (Zubović / Vida)
- Low cost: 100€
- All-in-one:
camera
capture/detect/process
internet
- Open source software



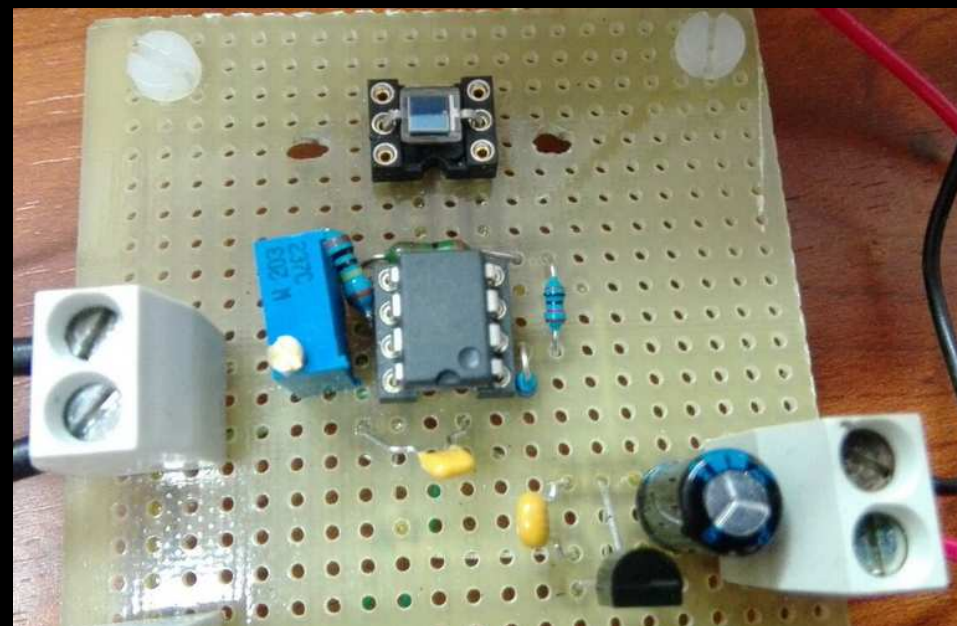
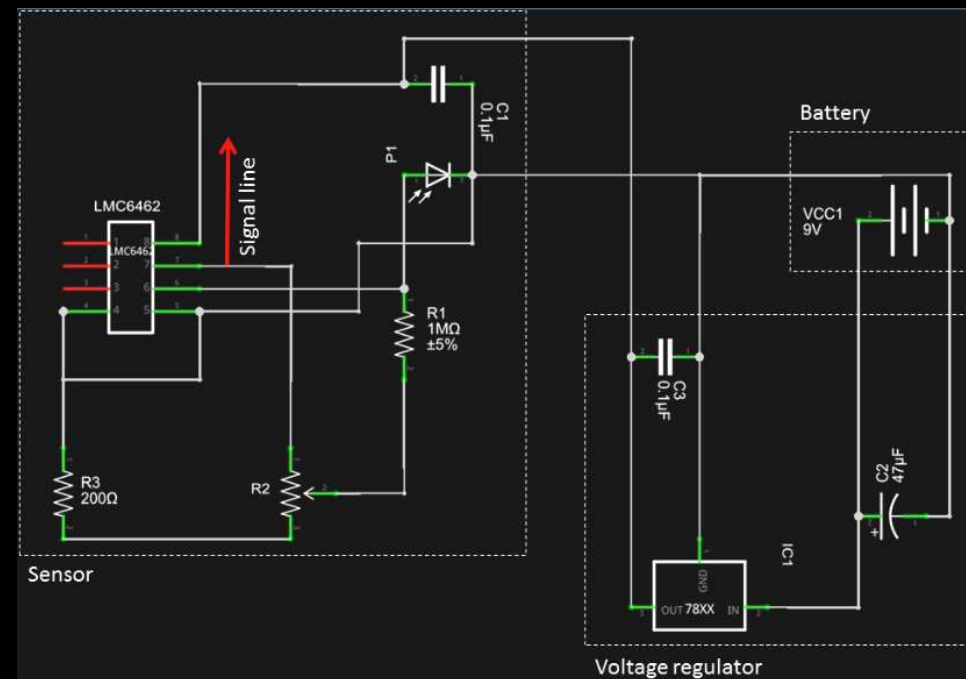
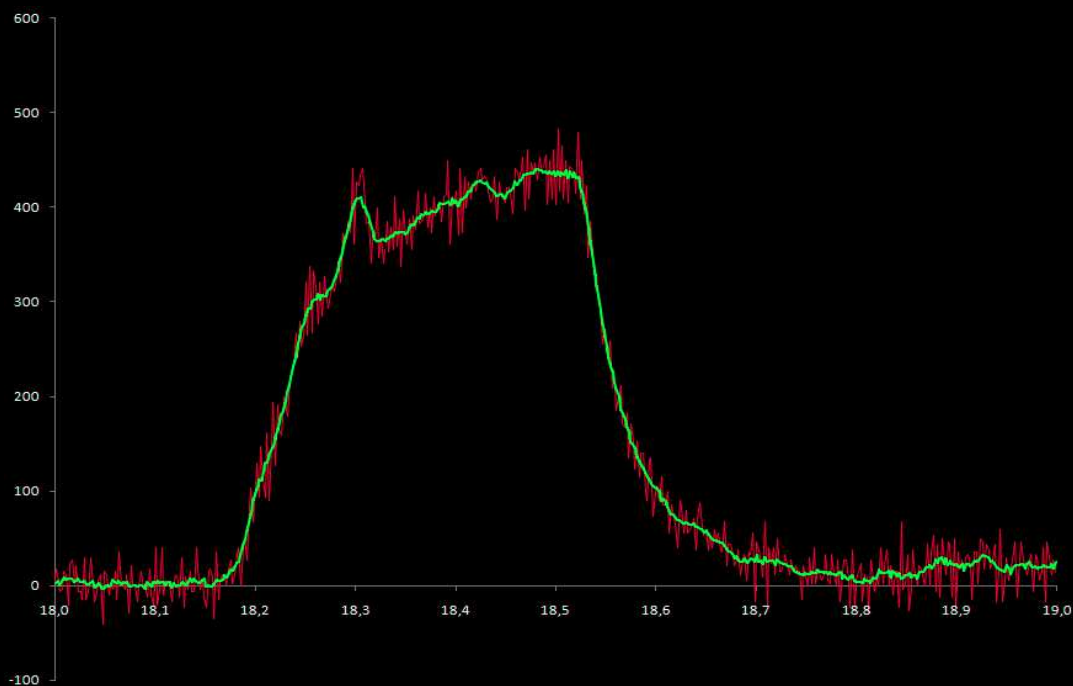
New Fields of Research

- Raspberry Pi - global system?



New Fields of Research

- Radiometer for everybody:
data acquisition in the CMN way



Education

- Visnjan School of Astronomy
- Use of original observational data, introducing youngsters to science and scientific methods
- Need for updated references on IMO page



- To be done: global presentation on meteor astronomy and opportunities for educational work

Summary

- An overview of CMN activities between two IMCs given
- Plenty of things done
- To be done: much more!



Acknowledgements

All the CMN members for their devoted work and persistence

Ministry of Science, Education and Sports of the Republic of Croatia

Višnjan Science and Education Center, Croatia

Astronomical Society "Istra" Pula, Croatia

Thank you for your attention!
Questions?

Appendix 1

***EFFIO** – NOT a sensor, but signal processor chip!

http://www.sony.net/Products/SC-HP/cx_news_archives/img/pdf/vol_61/cxd4127_4816gg.pdf

Different sensors may be used with the same processor chip, for example “Effio-E” is being sold with ICX 632/633, 810/811 as well as most sensitive ICX 672/673

Figure 1 “Effio-E” System Configuration

