

DVTI + CAM

**Development of a digital video camera
with time insertion**

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Project Status Update

ESOP XLI / Granada, Spain / 10.-11.09.2022

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Agenda

- **Final product «DVTI+CAM»**
 - Front side
 - Back side
 - Inside / taking apart / sensor upgrade
 - Software
- **Start of order process**
 - Product web site
 - Plan for selling the first batch / timeline
- **Further development**
 - Hardware
 - Software
- **Questions**

DVTI+CAM

- **Affordable, easy-to-use digital video camera for observing stellar occultations**
 - Control software (MS Windows only)
 - occultation tools integration (OW, C2A, ...)
 - telescope control (via ASCOM)
 - plate solving
 - report generation
 - No time inserter, digitizer, power supply, ..., only the camera and GPS antenna
 - No calibration required
 - User upgradeable (hardware, e.g. image sensor, and firmware)
 - planned to provide sensor upgrade kits in the future
 - Automatic image sensor type detection (same firmware for all sensors)
- **Developed by Stefan Meister and Andreas Schweizer (SOTAS – Stellar Occultation Association Switzerland) with the help of many people in the community**
- **For technical details: <https://esop40.iota-es.de/lectures/Schweizer.pdf>**

Front side

Small holes

to open the camera

Image sensor

- IMX174
- IMX430
- more in the future
- user replaceable

M42 thread

2" filter thread



Front side: 1.25 inch adapter, 2 inch filter



M42 to 1.25 inch adapter



2 inch filter

Back side

Antenna connector

Active GNSS antenna

GPIO

1 in, 1 out
(debugging, ...)

SYS LED

Status, errors

USB-C (USB3)

Data + power

1PPS LED

GPS 1PPS



Inside





85cm Cassegrain | 50cm Newton

Camera
DVTI-CAM - P3-IMX174 - #20 - 0.9.77 --°C
Status USB3.0
Error Counters P3780:000 L0:0000 R0

Resolution
960 x 600

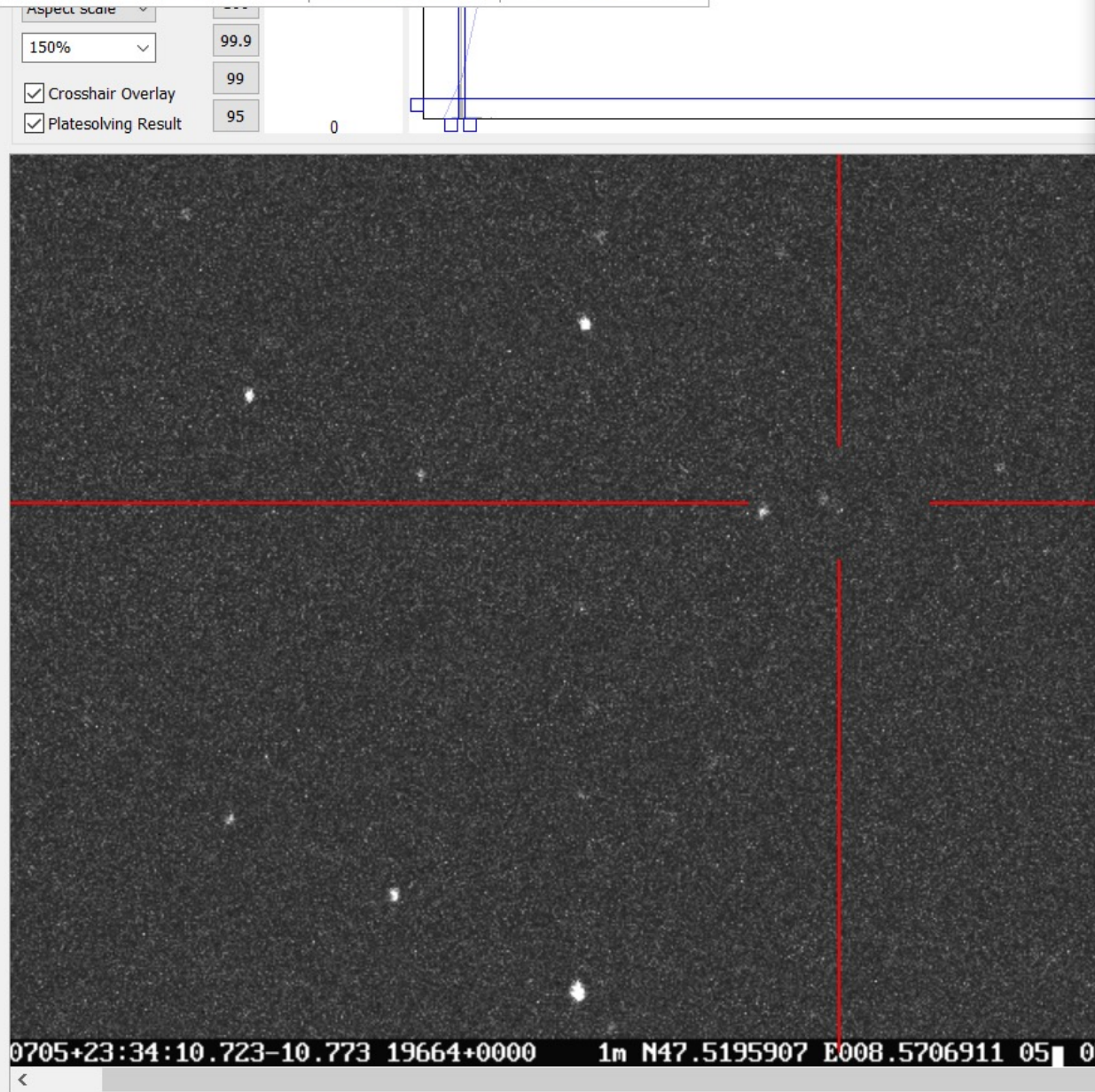
Exposure and Gain
Exp (ms) 50 | Frame rate (fps) 20.0
Gain +24 dB | High Gain Mode

Image Processing
 8-bit Invert Clip on Ovf. Flip none
 FPN reduction Shift Dark D20210705_960_24dB_0050ms.fits Offset 4000
 Flat

Overlay
 1PPS PC Time
 ISR ascii Resolution 0.1ms

ROI
 Enable ROI mode Start Editing Clear Zones
Only supported for recording ADV video

Statistics
Queue Length 0:18692 1:0 2:0 3:0 F:0
Processing <3/4:18691 <1:0 >1:0
Recorded frames 127 (missed 0) 63 s
Missed 0 Reset



Occultation Events

< 05.07.2021 > Today + xml

05.07.2021 20:39:42UT ±6.5s	-2h 54m	
(83830) 2001 UM22 - G172900.7-205840 D=0.8s P=8.2% mc=13.9 dm=4.5		
05.07.2021 21:42:52UT ±6.9s	-1h 51m	
(10248) Fichtelgebirge - UCAC4 331-128675 D=0.7s P=5.5% mc=14.6 dm=3.4		
05.07.2021 22:10:37UT ±2.7s	-1h 23m	
(5965) 1990 SV15 - UCAC4 352-102041 D=0.8s P=43.8% mc=13.8 dm=3.4		
05.07.2021 23:08:21UT ±4.1s	-25m 49s	
(569) Misa - UCAC4 331-092136 D=6.0s P=37.6% mc=14.3 dm=0.6		
05.07.2021 23:51:50UT ±1.8s	17m 39s	
(2978) Roudebush - UCAC4 324-138657 D=1.7s P=83.7% mc=12.6 dm=3.7		
06.07.2021 00:05:35UT ±7.9s	31m 25s	
(3451) Mentor - UCAC4 486-093972 D=8.2s P=20.7% mc=15.0 dm=0.4		

Event Data

Date / 05.07.2021 23:51:50

Max. Duration 1.7 s

Probability 83.7 %

Objects

Asteroid (2978) Roudebush

Star UCAC4 324-138657

Combined

Position 18h 14m 10.1s

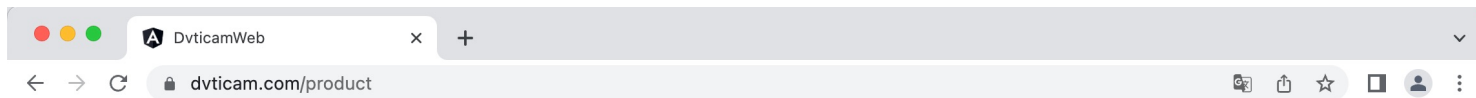
Distance -

Report

Recording -

[Create Report...](#)

Web site – <https://www.dvticam.com>



DVTI + CAM Product Gallery Support About Shop



Product

The DVTI+CAM is a small, affordable and easy to use digital video camera with time insertion, optimized for observing stellar occultations. It has been developed and tested with feedback and support from the stellar occultation community. A dedicated control software optimally supports the observation process.

For good performance, you need a reasonably modern PC running Microsoft Windows 10 or newer, with an USB-3 connector and a solid-state disk drive (SSD, ideally reserved for recording), because the camera generates large amounts of uncompressed image data which the computer needs to save on the disk.

The camera is **not** optimized for taking "pretty pictures". It contains no active cooling.

Fact sheet

[Legal Notice](#)

Buying the camera

▪ Availability

- 25 cameras built before the chip shortage
 - only 14x IMX174 sensors available
 - IMX430 sensors ordered, should arrive in early October
- Several components (FPGA, USB chip, ...) **unavailable until Q3 2023**
(or available at very high price from brokers) → **we can't build more cameras now**

▪ Price

- IMX174 model: CHF 950 excl. VAT (0% in Switzerland, 19% in Germany etc.)
- IMX430 model: CHF 1100 excl. VAT
- IMX430 sensor upgrade kit planned
- Next batch will probably be more expensive due to higher component prices

▪ Ordering process

- **Subscribe to mailing list on <https://groups.io/g/d-vti-cam/>**
- Start of sale planned for next week, deliveries IMX174 in October, IMX430 in November
- If there's more demand, we will start building more cameras afterwards



Timeline



September

ESOP41
Company,
Bank acct
Orders 1

October

CE/FCC
Packaging

Deliveries
IMX174

November

Deliveries
IMX430

Further development

- **Short term**

- Finalization of IMX430 integration
- ADV compression support
- Multithreading support for image processing

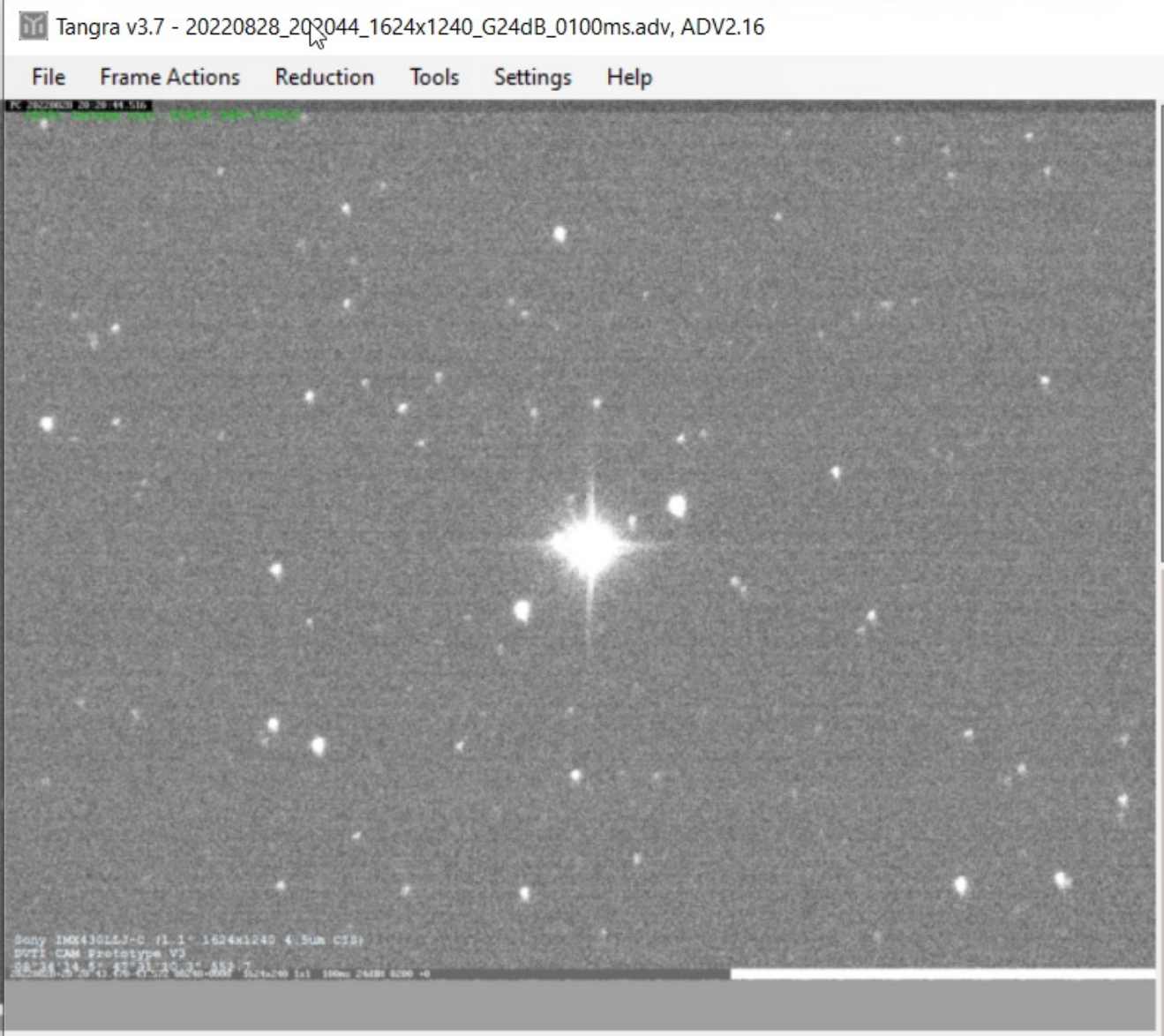
- **Mid term**

- Tests with IMX533 and GSENSE2020
- Faster frame rates / ROI improvements
- Automatic dark selection
- «Synchronous» mode (exposure controlled via 1pps)

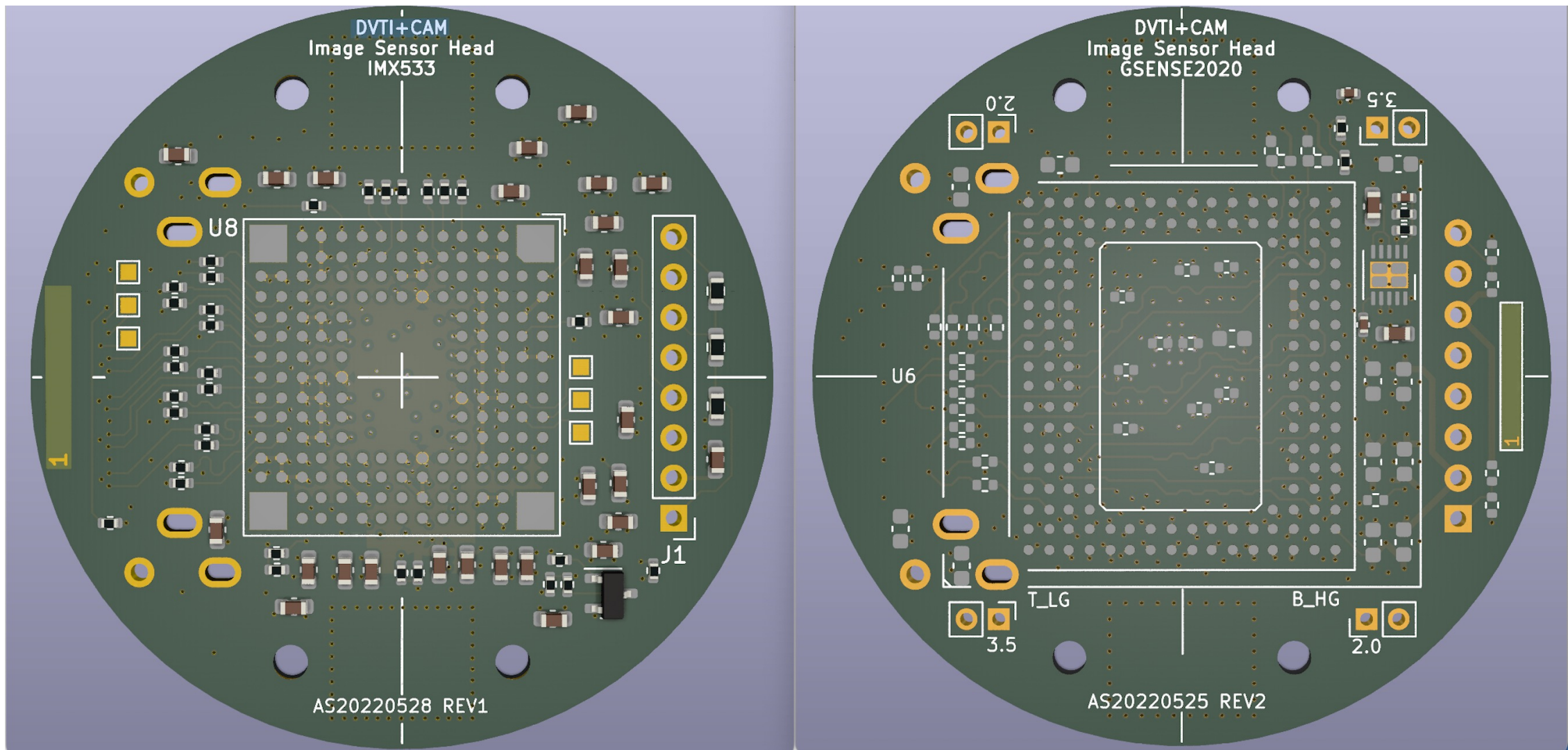
- **Long term**

- DVTI control tool for Linux and macOS?
- Cooled camera DVTI+CAM «Pro» with expensive sensors?

IMX430 Testing



IMX533, GSENSE2020 boards



Questions?

Thank you!