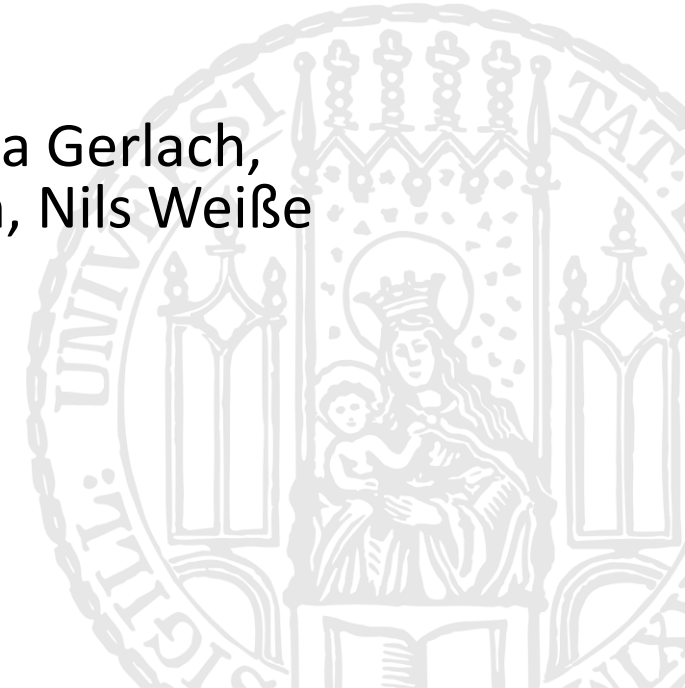


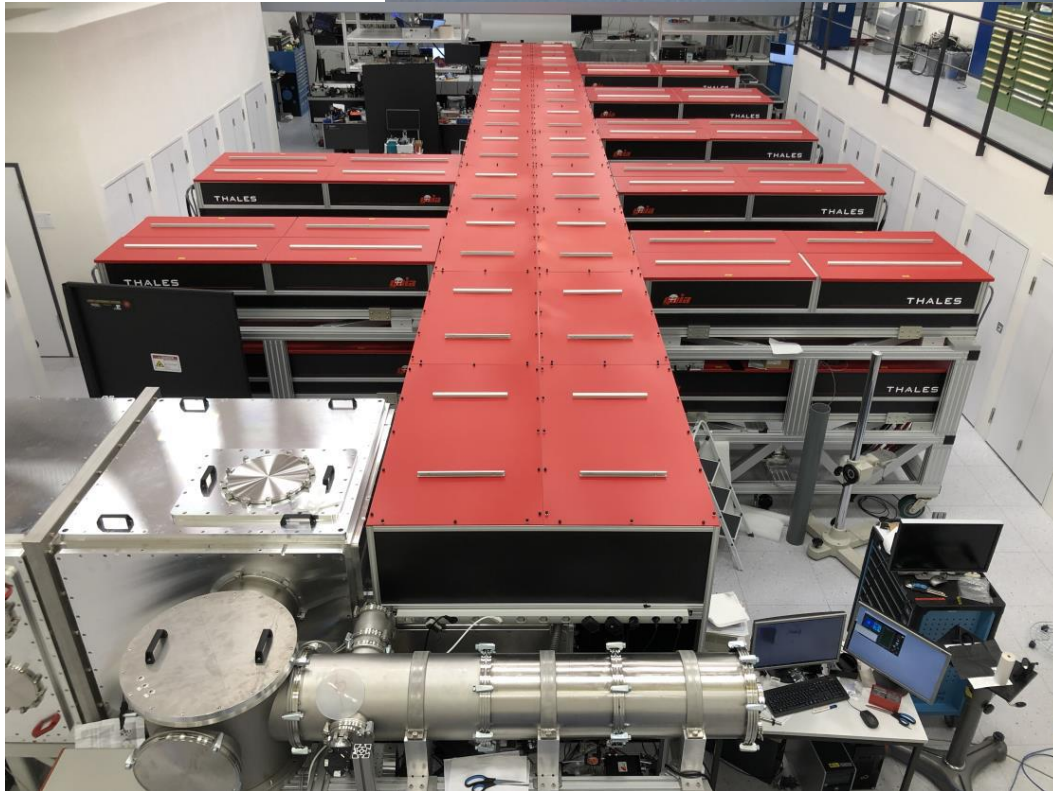
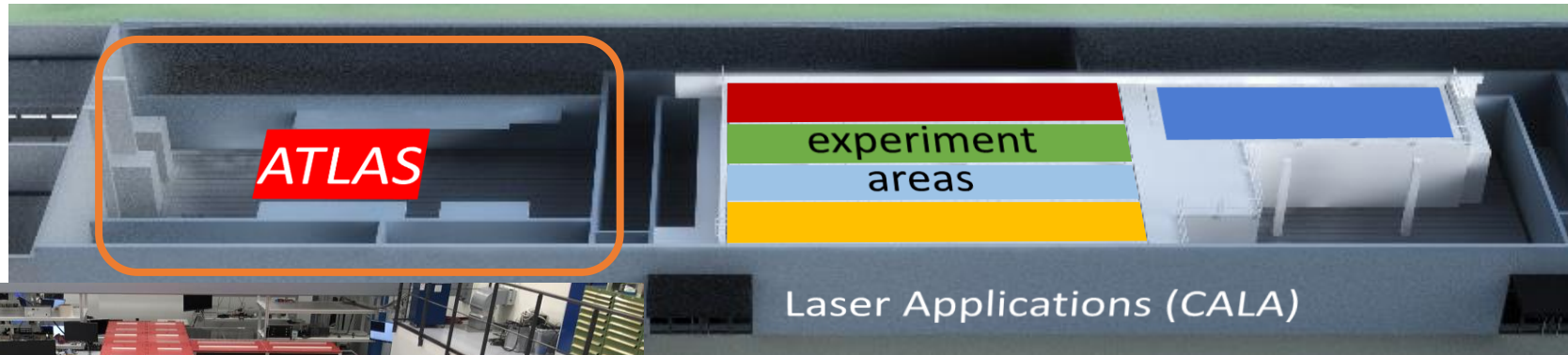
# Showcase of tools and solutions for the Tango infrastructure at the CALA laser centre

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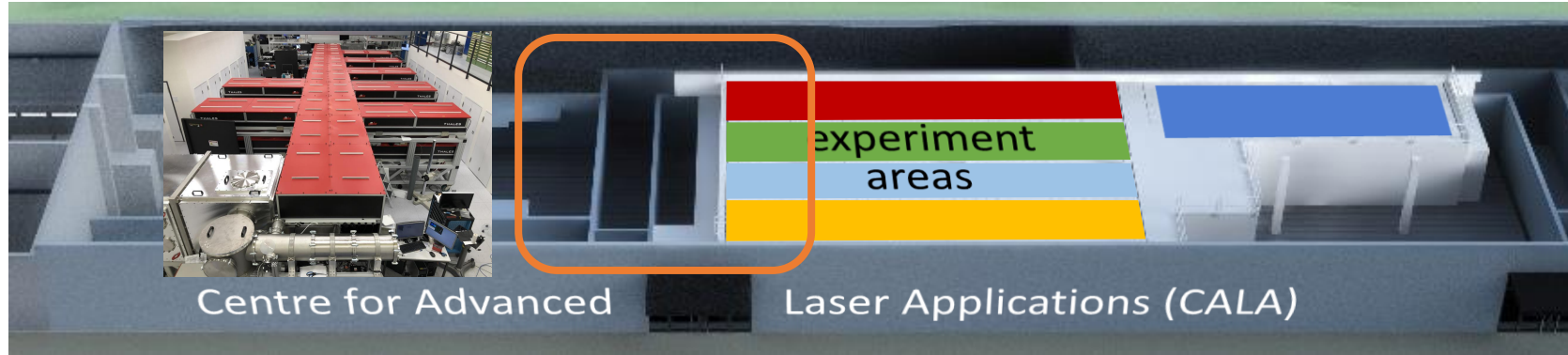
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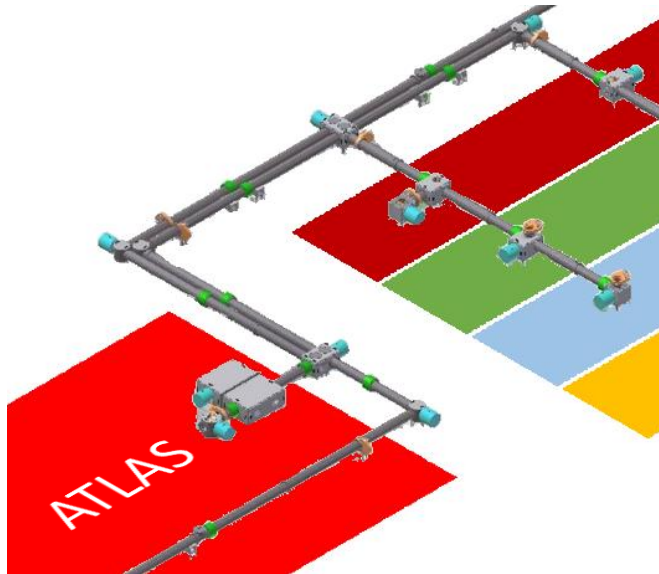


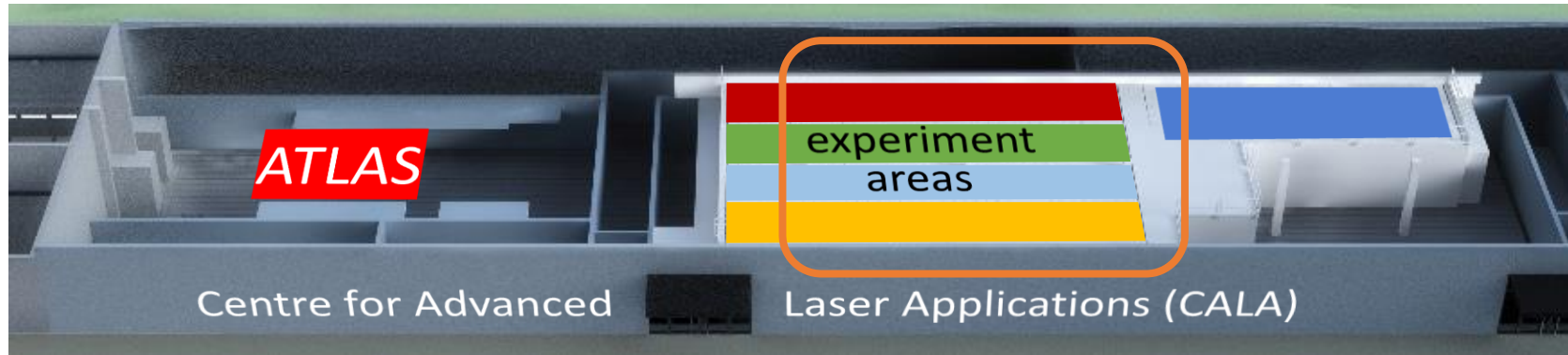


- Centre for Advanced Laser Applications in Garching near Munich, Germany
  - University lab, no user facility
- ATLAS-3000
  - Ti:Sapphire laser
  - 60J in  $\sim 20$ fs at 1Hz rate ( $< 3$  PW peak power)
  - operational since 2017, currently  $\sim 500$  TW



## Laser beam delivery



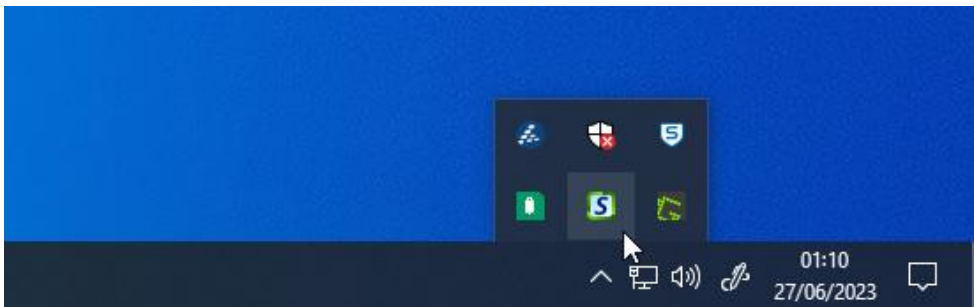


Ion acceleration	Electron acceleration	Other activities
<ul style="list-style-type: none"> <li>• protons, carbons → targetry, detectors, biomedical applications</li> <li>• gold, heavy ions → nuclear astrophysics</li> </ul>	<ul style="list-style-type: none"> <li>• Laser wakefield acceleration</li> <li>• X-rays via betatron or Thomson backscattering → accelerator research, biomedical imaging</li> </ul>	<ul style="list-style-type: none"> <li>• Strong field QED</li> <li>• laser pulse characterization</li> </ul>



- Python + PyTango only
  - ~800 devices on 5 TANGO\_HOSTs
  - 9 VMs (AlmaLinux)
  - 18 Windows hosts
  - 5 Raspberry Pis
  
  - **Limited work force**
  - Laser is „student-run“
  - Tango maintenance + development by PhD students, student assistants, recently 1 FTE
  - good support from university IT admins
- Archiving:
    - on-shot (up to 1Hz)
    - Text files, PNGs
    - <300GB per day

- „nssm“ for Starter.exe
  - Console not accessible
  - No network drive mapping
  - Permissions different
- „StarterToTray“
  - Keep code running in „user space“
  - But: hide in tray
  - Downside: start after logon only

A screenshot of a Windows console window titled "Starter To Tray Service". The window has a blue title bar and a white background. It contains a log of system commands and their outputs. The log shows the service starting and running, with several instances of "UEyeCamera/overview" and "PfeifferVacuumMPTGauge/1" being started and then stopped. The log also shows error messages like "Cannot get the address of parameters failed" and "Ready to accept request". The window has a status bar at the top showing "Status: Running" and buttons for "Autoscroll", "Unregister Autostart?", "Register Autostart", "Quit?", and "Minimize".

```
system("C:\tango-root\starter_bin\UEyeCamera.bat overview);
UEyeCamera/overview is running but not responding !!!
UEyeCamera/overview is running but not responding !!!
UEyeCamera/overview is running but not responding !!!
UEyeCamera/overview stopped
UEyeCamera/overview is running but not responding !!!
UEyeCamera/overview is running but not responding !!!
Ready to accept request

UEyeCamera/overview is running but not responding !!!
Cannot get the address of parameters failed : Only part of a ReadProcessMemory or
WriteProcessMemory request was completed.

PfeifferVacuumMPTGauge/1 stopped
PfeifferVacuumMPTGauge/1 is running but not responding !!!
PfeifferVacuumMPTGauge/1 is running but not responding !!!
Ready to accept request

system("C:\tango-root\starter_bin\PfeifferVacuumMPTGauge.bat 1);
PfeifferVacuumMPTGauge/1 is running but not responding !!!
PfeifferVacuumMPTGauge/1 is running but not responding !!!
```

- Python+PyTango:
  - Deployment == „git pull“
  - Tip: Use „pip install -e“ to avoid copy to „Lib\site-packages“
- GitMonitor
  - Scan all repositories in „C:\tango-root\tangolib“
  - Every day 5AM do „git pull“ if clean state
  - Compile central table of all hosts in helper device (with web view)
- (+ manual device restart)

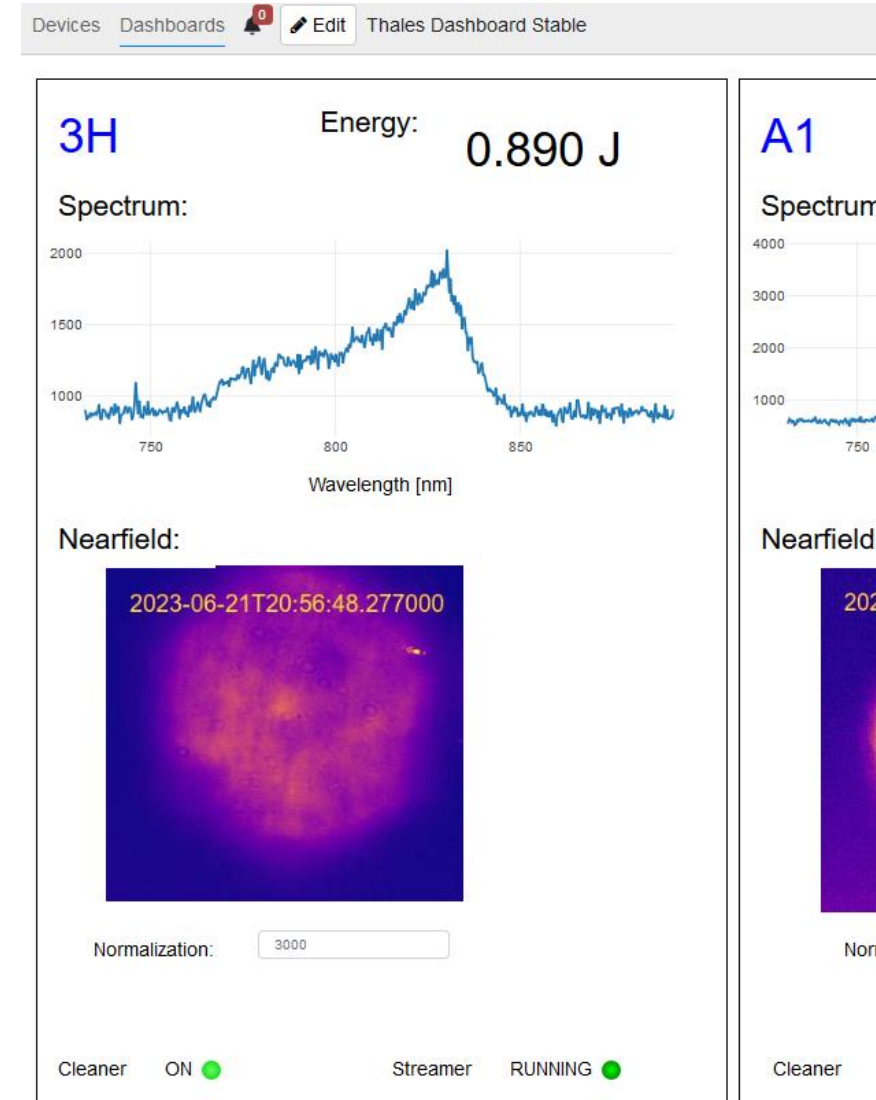
## Git Monitor Overview

Set AutoPullFlag False   

ON  
●  
2023-06-28 01:47:09.595105

GitMonitor State	repo	branch	AutoPullFlag	behind	ahead	pull_allowed	will_autopull	last_relevant_pull
RUNNING	hdr-runner	main	true	0	0	true	true	
RUNNING	imagecalculatorvisualization	master	true	0	0	true	true	
RUNNING	MatlabConversionRadEyeToPNG	master	true	0	0	false	false	
RUNNING	MatlabiBeatQuickEval	master	true	0	0	false	false	
RUNNING	nFTPS UIadjustment		true	0	0	true	false	
RUNNING	phymotion_reset_scripts	develop	true	0	0	true	false	
RUNNING	PyCamSaveOnTrigger	master	true	0	0	false	false	
RUNNING	pyCaveControl	UNKNOWN	true	0	0	false	false	
RUNNING	pyds_archiving	master	true	0	0	true	true	
RUNNING	pyHexapodPanel	master	true	0	0	false	false	
RUNNING	pyMotorPanel	master	true	0	0	false	false	2023-05-10 05:00:53.097
RUNNING	PyPreviewBackreflex	master	true	0	0	false	false	
RUNNING	PyPreviewCamImages	master	true	0	0	false	false	
RUNNING	PyPreviewRadeyes	master	true	0	0	false	false	

- Stream JPG to web browser
  - Save bandwidth
  - Taranta support via iframe
- Features:
  - Subscribe to any Image/DevEncoded attribute with „data\_ready\_event“
  - Send out next part of multipart for all clients
  - Colormap
- Caveats:
  - (no broadcast, still sent to all clients)
  - Legacy feature „multipart/x-mixed-replace“
  - Not nice user experience, e.g. loading cursor always





- Taranta support via iframe
- Dash Python framework
- Far better control of look and feel

Current Time: 2022-09-18 17:50:18

Incoming Light: Last Energy: 2.11e+0 mJ

HS Atten Filters 1 2 3 4

Blocksh Vacuum Infinity OUT

Chamberlight PMQ Platform Light

### ATLAS

LION allowed ●

Status: Connected. 1Hz Trigger missing for >5s!

Heartbeat: 1118722

### Experimental Control

State: The device is in ON state.

Status: ●

ExpNo: 20220913

Shot: 323

Run: 26

Description: 18B06;400;Formvar;

### Motion

	State	Position	Position State
Blockshutter	<span style="color: green;">●</span>	498	
Target-Theta	<span style="color: green;">●</span>	62740	
Buncher-x	<span style="color: green;">●</span>	152.00	
PMQ1-X	<span style="color: green;">●</span>	-0.50	OUT

### Vacuum Cameras

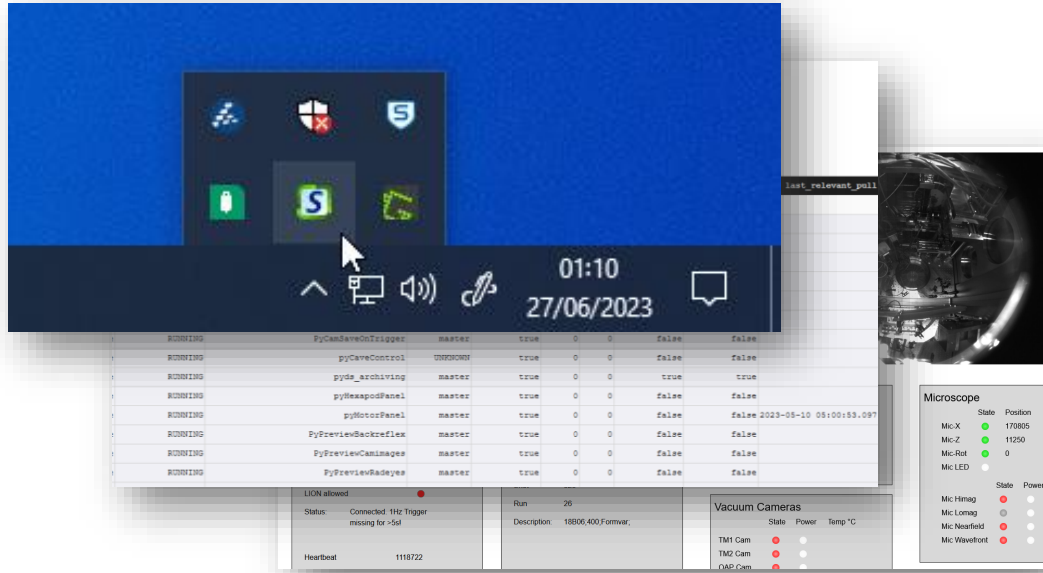
	State	Power	Temp °C
TM1 Cam	<span style="color: red;">●</span>	<span style="color: white;">●</span>	
TM2 Cam	<span style="color: red;">●</span>	<span style="color: white;">●</span>	
OAP Cam	<span style="color: red;">●</span>	<span style="color: white;">●</span>	

### Microscope

	State	Position
Mic-X	<span style="color: green;">●</span>	170805
Mic-Z	<span style="color: green;">●</span>	11250
Mic-Rot	<span style="color: green;">●</span>	0
Mic LED	<span style="color: white;">●</span>	

	State	Power
Mic Himag	<span style="color: red;">●</span>	<span style="color: white;">●</span>
Mic Lomag	<span style="color: gray;">●</span>	<span style="color: white;">●</span>
Mic Nearfield	<span style="color: red;">●</span>	<span style="color: white;">●</span>
Mic Wavefront	<span style="color: red;">●</span>	<span style="color: white;">●</span>

- CALA in Garching (Munich)
  - ATLAS-3000 Petawatt laser
  - particle acceleration, fundamental research
- Showcase of
  - StarterToTray
  - GitMonitor
  - JPG streamer
  - Dash dashboard



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