FIREFLY
AEROSPACE

SOL3

Integrated Vision System for Autonomous Spacecraft

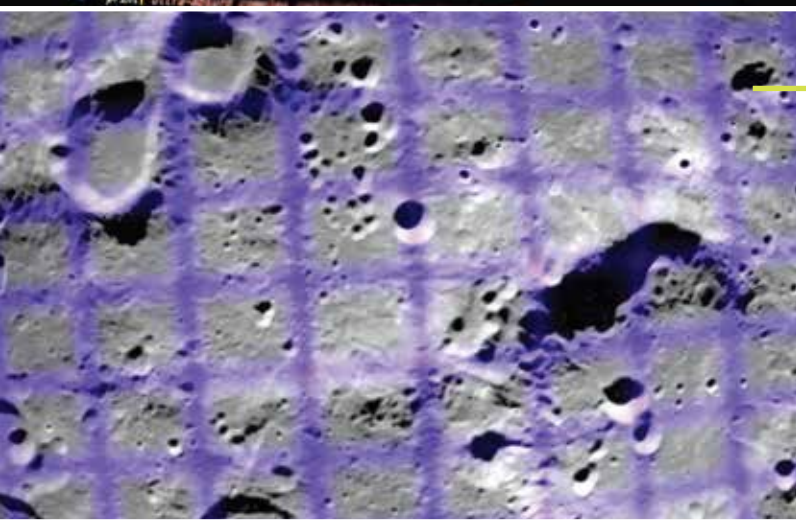
CAPABILITIES

Imaging

- Monitor structures, payloads, deployment activities, and the space environment with ad-hoc, scheduled, or event-driven image acquisition.
- Leverage on-board video encoding and post-processing, video streaming, HDR capture, and metadata management.

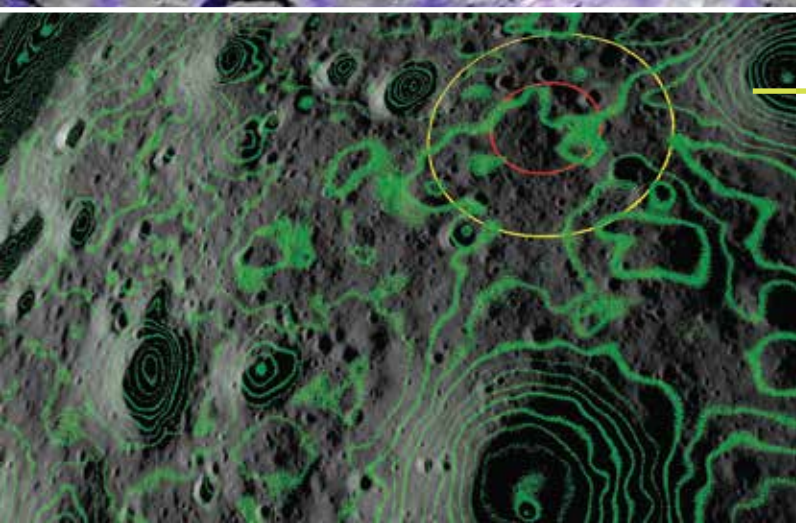
Custom Applications

- Build custom applications on top of heterogeneous compute (CPU, GPU, NPU) in a flexible software environment.
- Develop, test, and operate efficiently on top of foundational capabilities including camera calibration, image simulation, and on-orbit software updates.



State Estimation

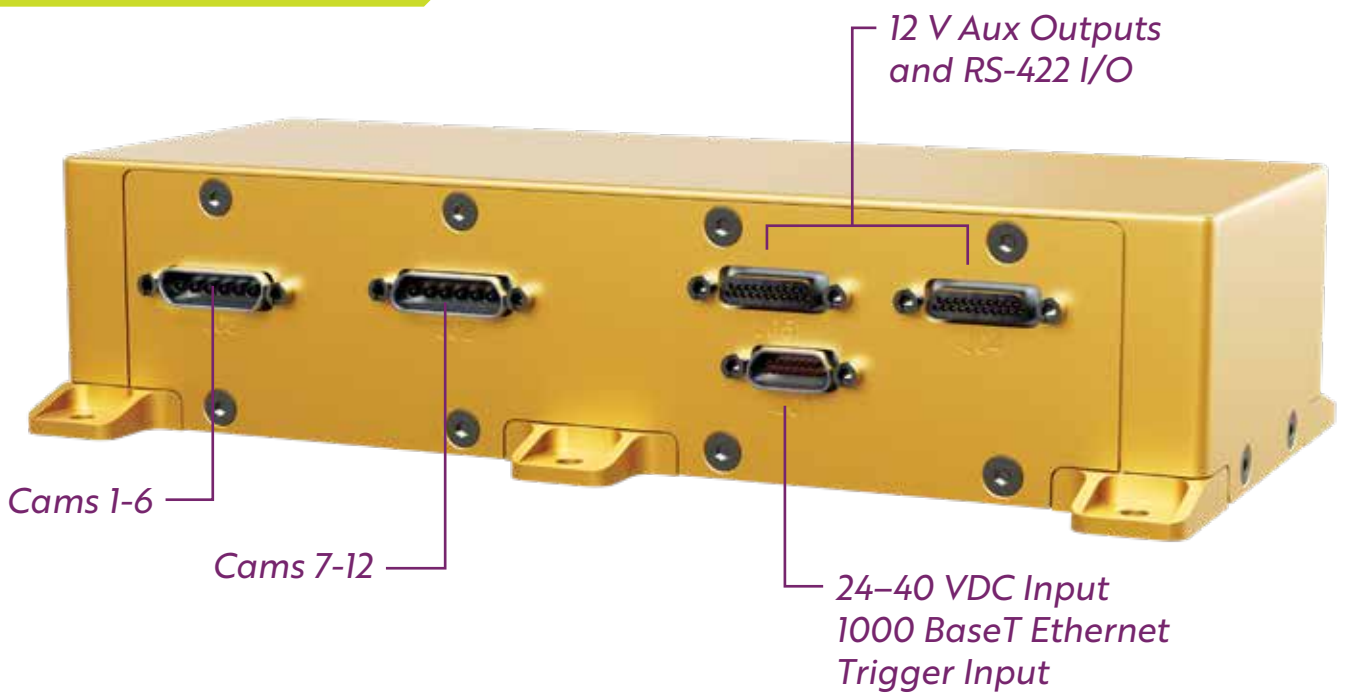
- Achieve high-precision estimation of spacecraft position and attitude relative to terrain, stars, astronomical bodies, and rendezvous targets.
- Extend navigation capabilities and increase fault tolerance with multi-camera measurements.



Perception

- Detect and characterize hazards, landmarks, or other targets of interest for terrestrial or orbital applications, including rendezvous, proximity operations, and docking.
- Support space domain awareness applications with object detection, optical orbit determination, stereo depth estimation, and 3D reconstruction.

Sol3 BASE UNIT



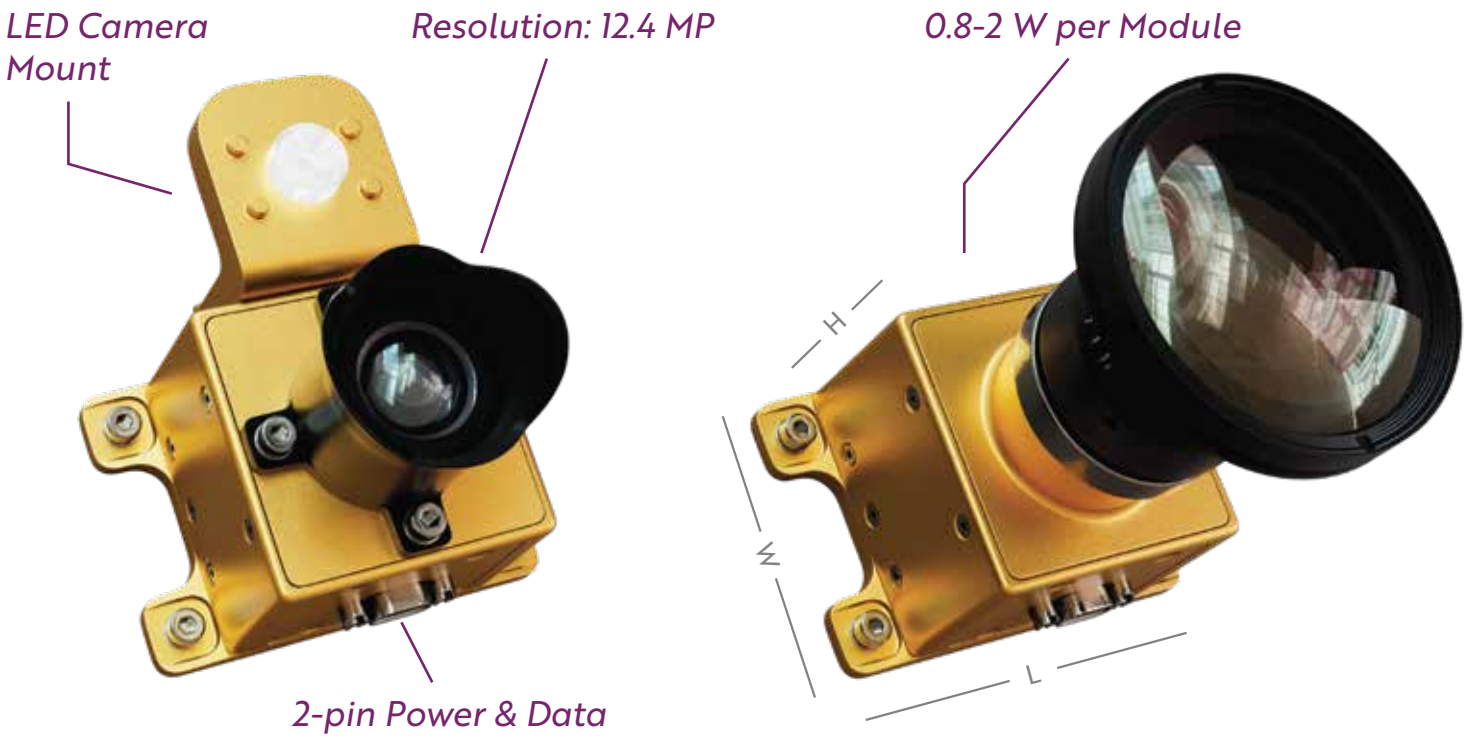
Optimized Compute for Imaging, Navigation, & Beyond

- Supporting up to 12 Camera Modules, the Base Unit supplies centralized processing, power, and data to support Firefly's various algorithms, including adaptive video compression, optical navigation, and neural-network-based pose estimation.
- Software integration on the Base Unit is adaptable, ranging from simple command and telemetry to custom computer vision application development using the Sol3 SDK.

Spacecraft Interface	
Data:	10/100/1000BaseT
Input Voltage:	24-40 VDC
I/O	
Camera Modules:	12 (6 Simultaneous)
Input:	Isolated Trigger (5 V)
Output:	2x Aux 12 V Power
Data:	2x RS-422
Integrated IMU:	4 X 6DoF Chip Scale IMUs

Mass & Power	
Dimensions (cm):	L:19.8 x W: 10.2 x H: 5.0
Mass:	<0.75 kg
Idle Consumption:	<3 W
Max Consumption:	30 W
Compute	
CPU:	8-core ARM Cortex
GPU/NPU:	15 Tera Operations Per Second
RAM:	8 GB
Storage:	1 TB

Sol3 CAMERA MODULE



Seamless Vision for Any Mission

- Each Camera Module can be configured with various sensors, mounts, LED illuminators, and lenses to support multiple use cases, including autonomous navigation, 360° situational awareness, and payload imaging.
- The Camera Module delivers full-resolution image frames at a low integration cost by providing both power and data over a single twisted pair.
- The Camera Module connects to the Base Unit with an included custom harness of up to 10 m in length.

Specifications			
Dimensions	L: 6.5 cm (2.5 in)	W: 4.8 cm (1.75 in)	H: 4.2 cm (1.5 in)
Mass	0.15 - 0.28 kg		
Sensing			
Sensor Options	RGB or Monochrome		
Shutter Type	Rolling or Global		
Bit Depth	8 to 12-bit		
Frame Rate	>30 FPS Full ROI (10-bit mode)		
Integrated IMU	6 DOF IMU on every camera module		
Connectivity			
Data Rate	Up to 6 Gbps per camera module		
Cabling	Single 24 AWG coax for power and data		
Cable Length	Up to 10 m between base unit and cam modules		

Lenses & Lights

S-185

S-123

S-85

S-64

S-28.2

S-22.1

S-14

Flight S-Mount Lenses

Lens	HFOV	VFOV	F#
S-185	185°	185°	2.0
S-123	123°	89°	2.8
S-85	85°	63°	2.8
S-64	64°	51°	2.6
S-28.2	28.2°	21°	2.5
S-22.1	22.1°	16.5°	2.5
S-14	14°	10.5°	2.5

Flight C-Mount Lenses

Lens	HFOV	VFOV	Min F#	Max F#
C-88	88°	70°	2.4	16
C-38	38°	28°	1.8	11
C-11	11°	8°	4.0	22

C-88

C-38

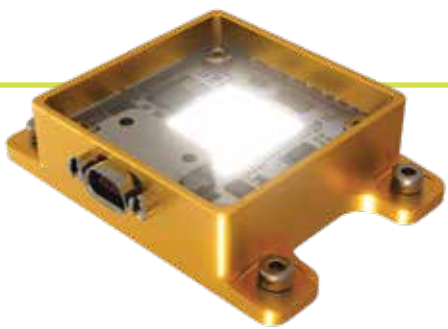
C-11

LED Camera Mount

Our integrated LED mount is more than a convenience, it's a field-tested solution for operations where local illumination is required

Floodlights

Our standalone floodlights match the form factor of our cameras and are built to slot seamlessly into the Sol3 architecture. Whether illuminating shadowed structuresduring RPO or supporting close-range inspection, they deliver targeted, reliable lighting without adding unnecessary bulk



Sol3 HDK *Hardware Development Kit*

- The Sol3 HDK puts flight-like compute and sensor hardware in engineers' hands early — accelerating integration and reducing surprises later in the program.
- Built as closely as possible to the flight units while avoiding the cost that comes with flight-grade parts, the Sol3 HDK lets you prototype, test, and move into IT&V with minimal software changes.

	Flight	EDU	HDK
Design	Flight Ready	Identical to Flight without acceptance testing	Lab and light field use
Material & Finish	Chemfilmed Aluminum	Chemfilmed Aluminum	Anodized Aluminum
Input Voltage	24–40 VDC	24–40 VDC	10-36 VDC (AC Adapter included)
Connectors	Flight-Grade	Flight-Grade	Commercial-Grade
Parts	Flight-Grade	Flight-Grade	Commercial-Grade

Sol3 HDK Lens Options

Lens	HFOV	VFOV	Min F#	Max F#
C-115.6	115.6°	70°	2.4	16
S-64	64°	51°	2.6	

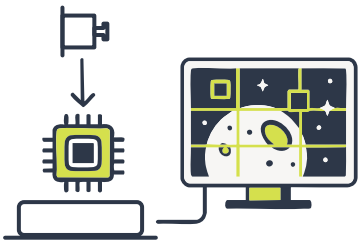
*Lenses subject to change without notice

The Sol3 HDK offers two lens options: the S-64 and the C-115.6. Both are focusable and removable and they are compatible with a wide range of S-mount and C-mount lenses. Additional lenses are available by special order.

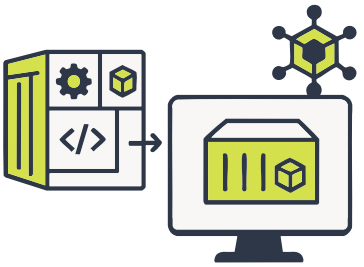
Sol3 SDK *Software Development Kit*

Sol3 SDK

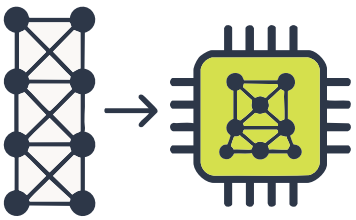
Sol3 flight software has everything you need to build a solution for your problem domain. Command cameras and stream imagery via the network API, or write a custom onboard application for direct access to heterogeneous compute and the imaging pipeline.



Real-time Image processing



Custom Containerized Applications



Deep Neural Network Acceleration

Modern Developer Experience

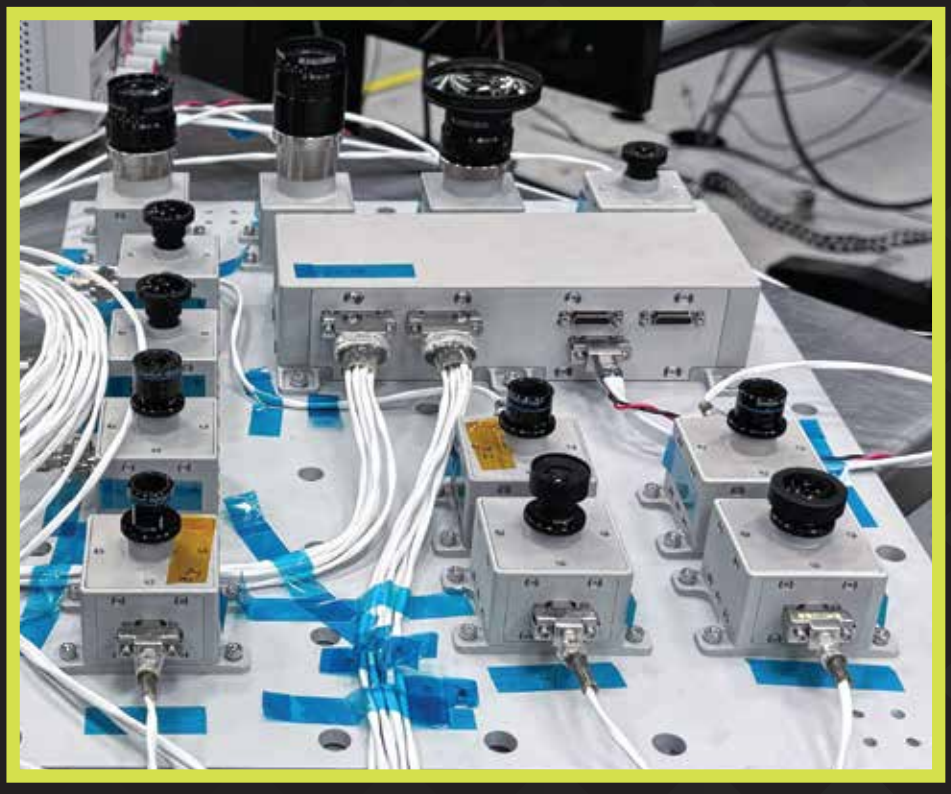
Sol3 Vision Simulation Workstation

Accelerate confidence in your flight software with image simulation and injection

Inject simulated images into the camera interface on the Sol3 Flight Base Unit or HDK. Bring your own GPU-accelerated simulation pipeline for advanced hardware-in-the-loop testing.

What Class Is Your Mission?

Let's tailor a vision system to match.
Whether for lunar landing, satellite servicing, or in-orbit inspection, Sol3 is built to adapt.



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