



RALCam-5 based EO system

**Operational Class Smallsat System for Sub-Metre Resolution
Optical Earth Imaging**

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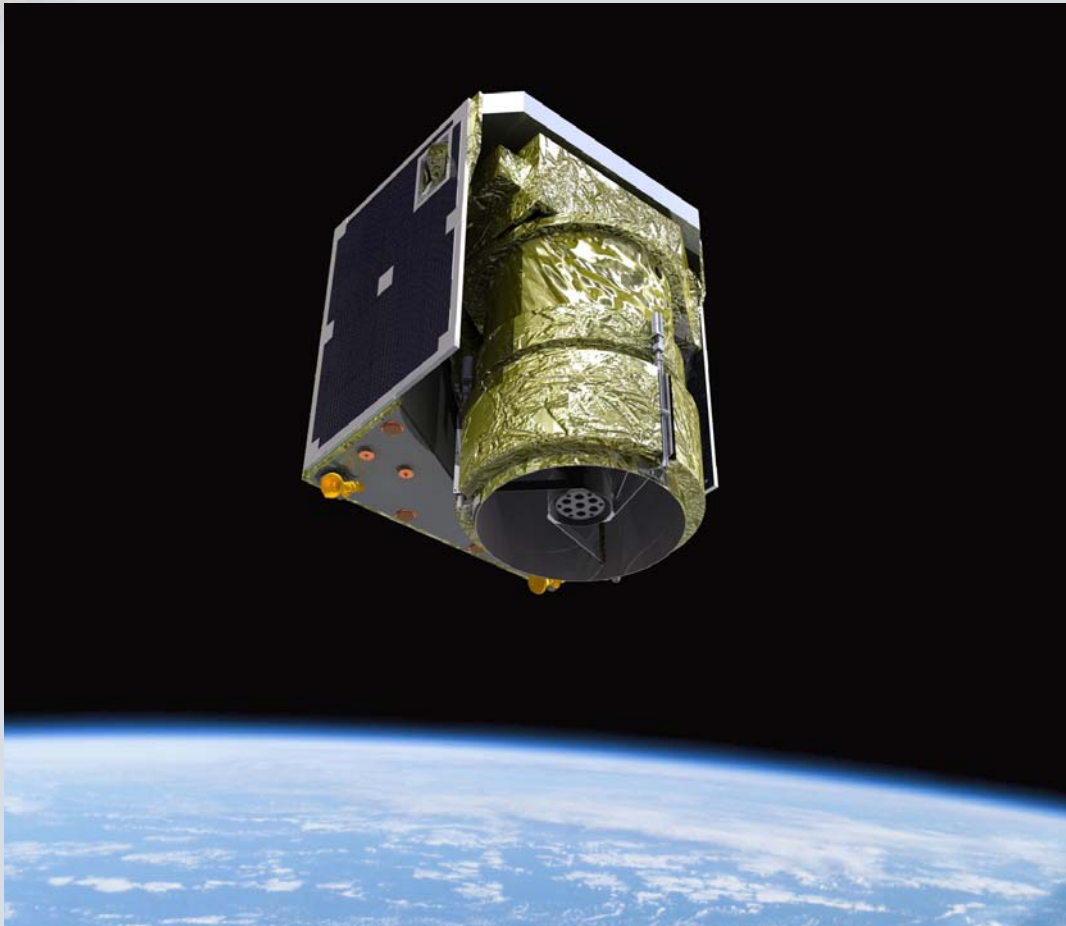
Low Cost, Operational imaging at Half-meter gsd



- MDA has long experience with operational satellite missions, covering entire data chain
 - Spacecraft (Radarsat, RapidEye)
 - Instruments
 - High-performance on-board processing
 - Ground segment
 - Data processing
- MDA has developed a partnership with RAL
 - RALCam optical cameras
 - High-performance for low cost
 - Matched to MDA bus and ground segment

Half-meter satellite

MDA spacecraft with RALCam-5: Low cost large area mapping enablers



Half-meter class camera

- RALCam-5
- Based on RALCam 4

High-capacity memory

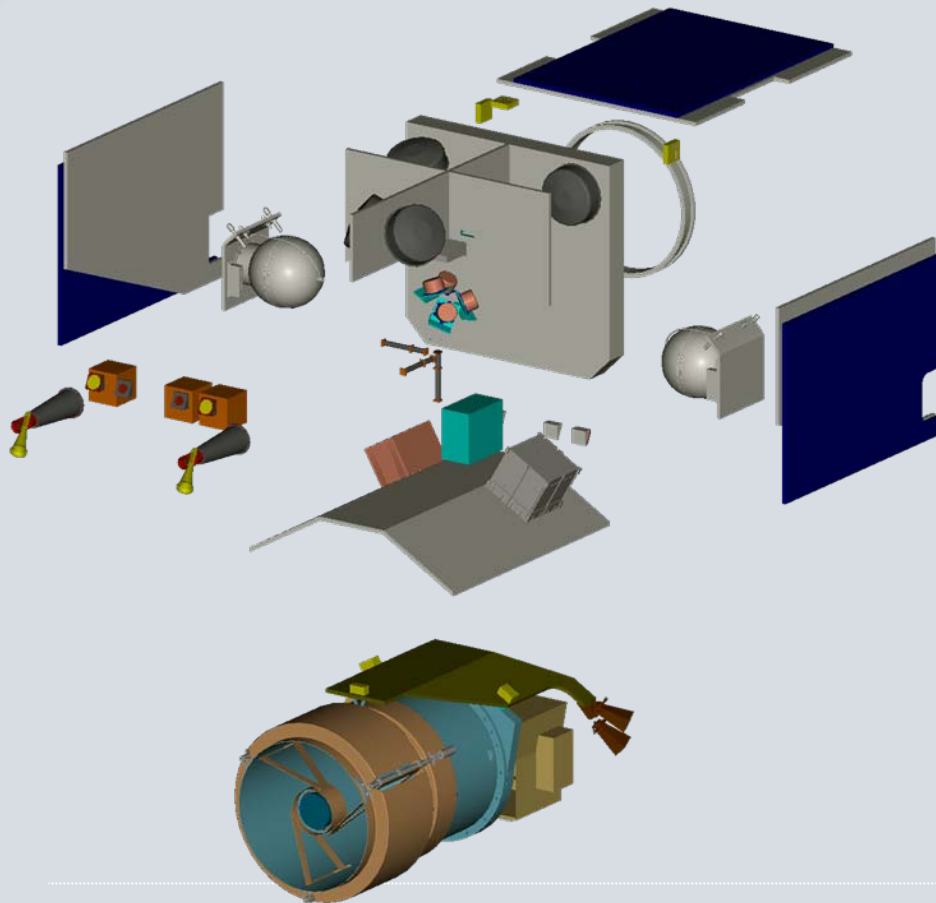
- PCPMU
- Data handling
- Data storage
- Data formatting

High-speed downlink

- X-band transmitters
- Gimbaled antennas

16x4000 km image per orbit
0.5 m PAN, 2 m multi-spectral data (RGBNir)

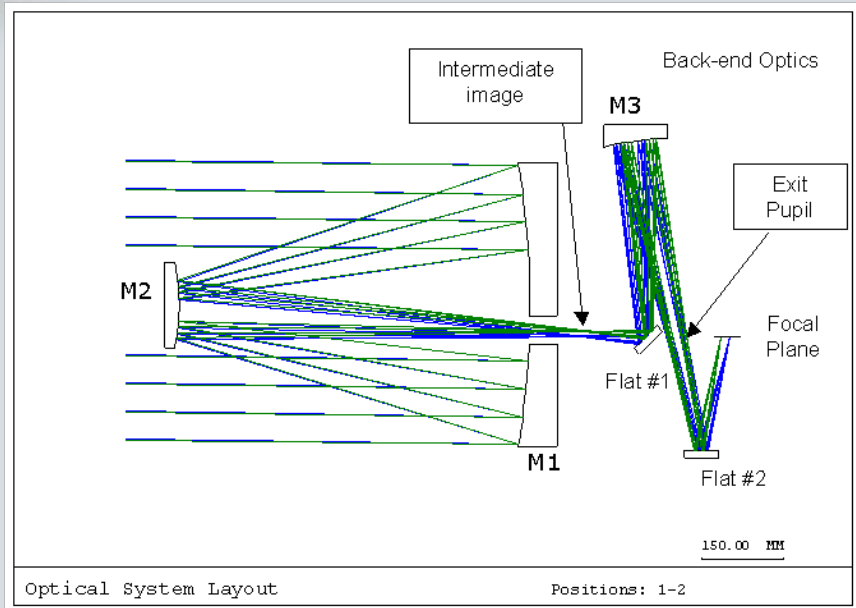
A capable bus at low cost



- **Simple structure**
 - Simple aluminum honeycomb panels
 - Easy access to all subsystems
 - Self-contained propulsion units
 - Thermal and jitter isolation between bus and camera
 - Non-deployed solar panels
 - Compact for agility
- **Based on MDA's 1-meter satellite**
 - Similar design principles
 - Larger wheels
 - More propulsion (Hydrazine)

RALCAM-5 optical camera

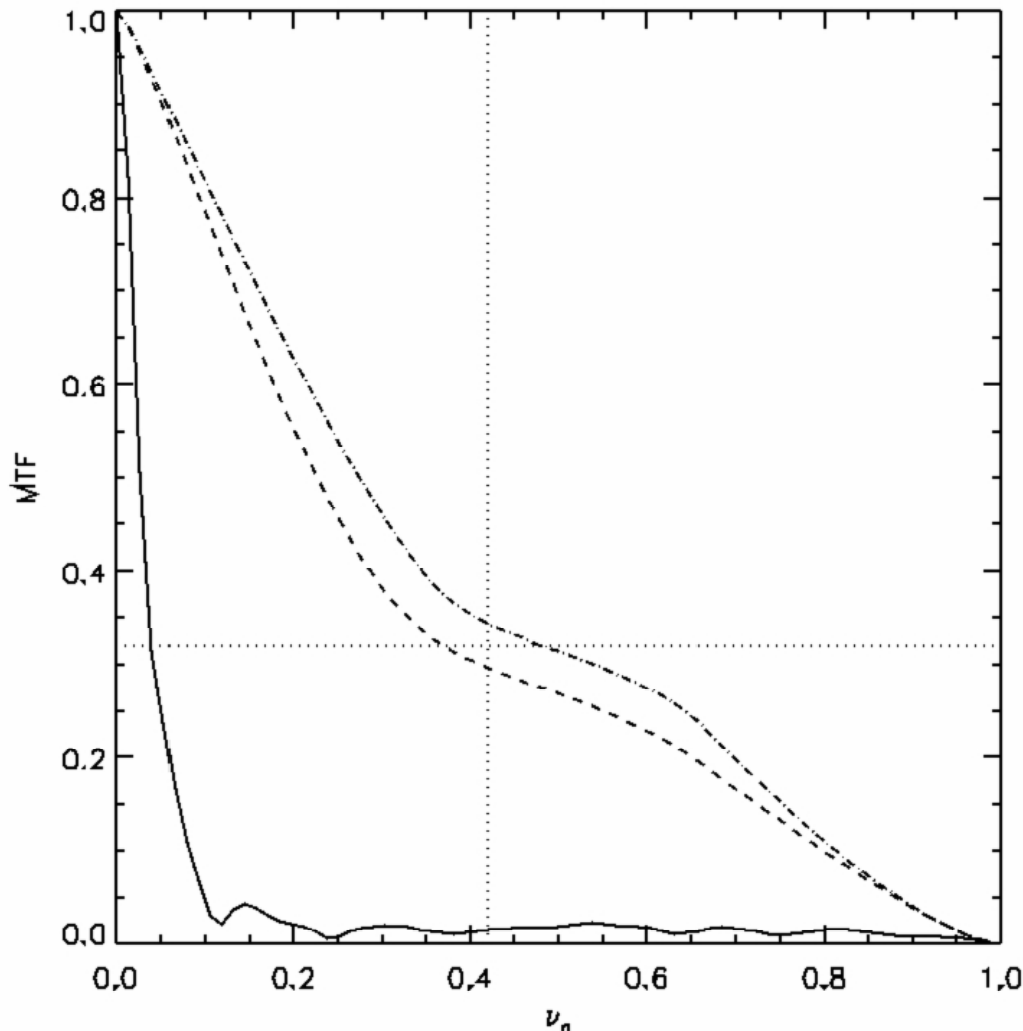
A high-performance camera without the cost of absolute stability



- **TMA telescope**
 - **Based on RALCAM-4 Korsch design**
 - **Wide FoV**
 - **3 active, 2 fold mirrors**
 - **All reflective, no chromatic correction needed**
- **Traditional manufacturing**
 - **Lightweighted Zerodur mirrors**
 - **CFRP metering tube**
 - **Low-risk to the mission**

On-Orbit Optical alignment

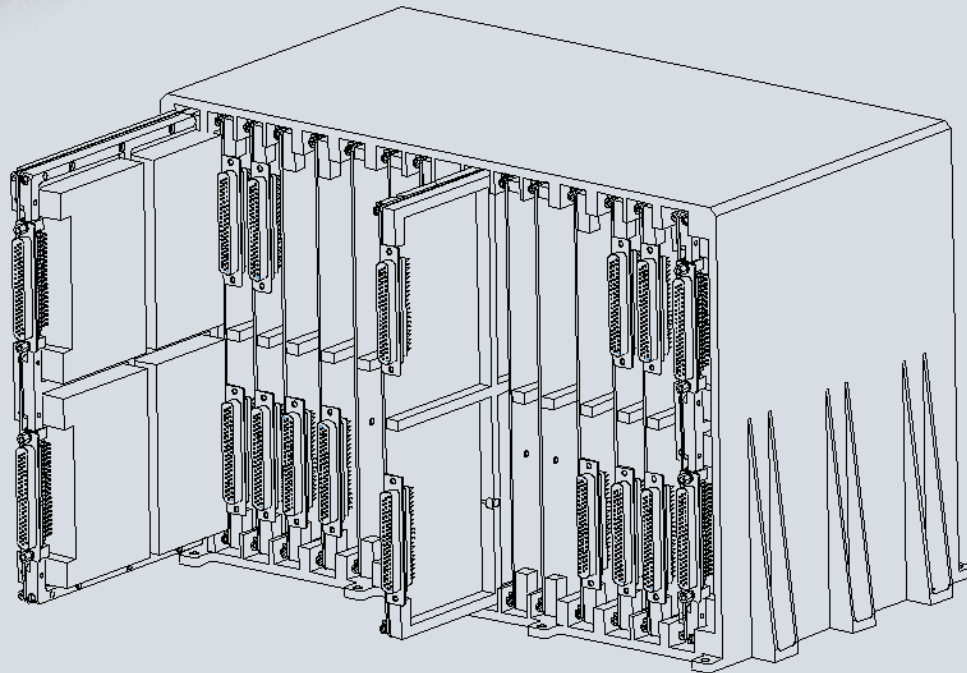
Innovative solution replaces costly stability requirements



- **On-Orbit Optical alignment**
 - **Mechanical shifts due to launch and moisture desorption are corrected in space**
 - **No expensive stable structure needed**
 - **MTF restored in orbit**
 - **Calculated performance shown**
 - original MTF
 - corrected MTF

Payload Controller, Processing and Memory Unit

Zero-standby power, very large storage capacity memory and processing

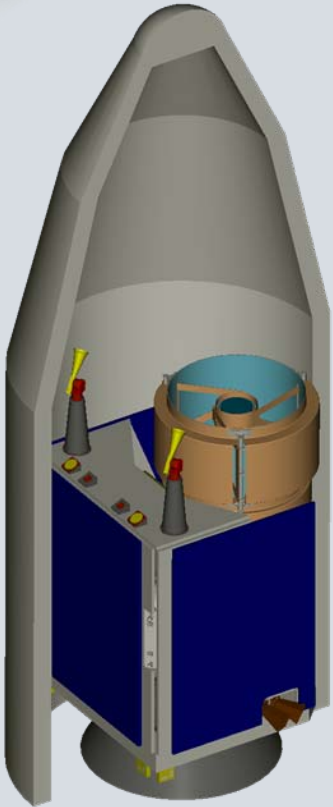


- **Multi function: PCPMU**
 - Control of camera
 - Interface to FPEA
 - Compression of data
 - Formatting
 - Several Tera-Bytes of memory
 - High speed 'Rocket' IO
- **Low power**
 - Zero-power memory at standby
 - Space rated flash

An integrated solution

All major developments and designs 'under one roof'

- Integrated design under single authority
 - Bus structure
 - Camera
 - Memory
 - Data downlink
 - Ground reception and processing
- Complete data chain
 - Image request and scheduling
 - Image take
 - On-board storage and handling
 - High-speed downlinking
 - Reception
 - Data processing
 - Product distribution
- Almost a million km² per day per spacecraft



Compatible with Minotaur-IV
low-cost launcher

Questions?

