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# **Bridging the gap between ideas and great discoveries, success stories and lessons learnt**

NTCO AGM

Anne-Sophie Poulin-Girard PhD, Senior System scientist – Space & Defense



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# ABB Measurements & Analytics

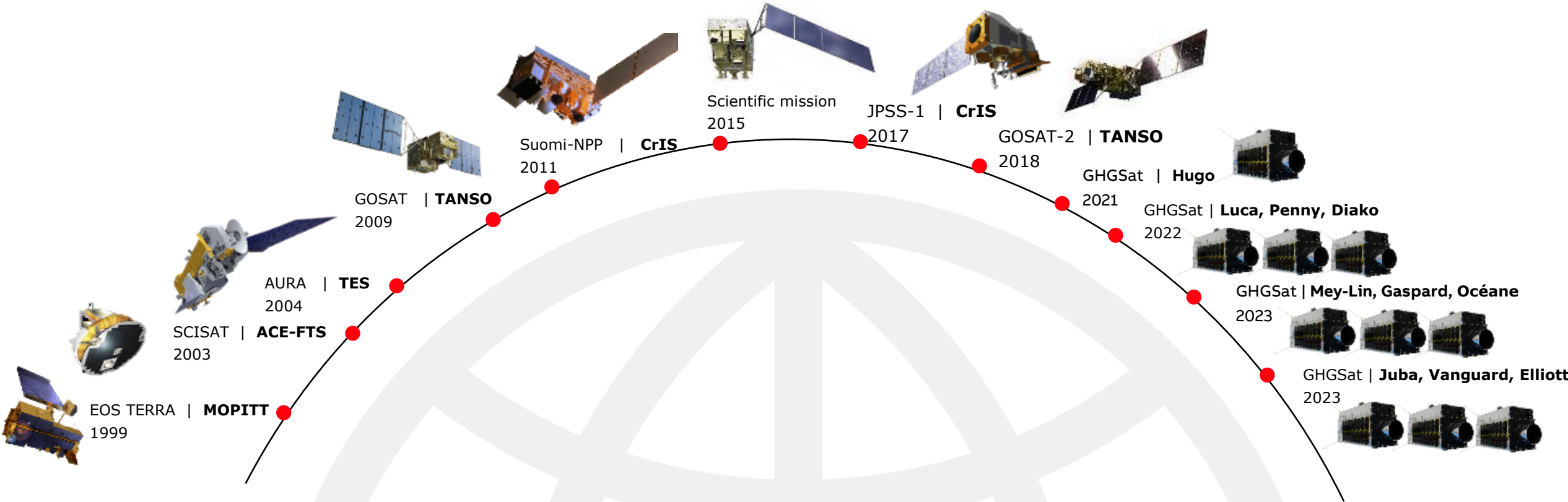
Center of excellence in optical instrumentation

- 1973: Bomen pioneering commercialization of Fourier Transform Infrared Spectrometers (FTIR)
- Now largest R&D group in PAMA globally
- **Recognized leader in:**
  - Measurement solutions for Industrial Process Monitoring and Quality Assurance/Control (QA/QC)
  - Custom **Optical Systems for Space and Defense**
- Over 50 000 instruments deployed worldwide running 24/7
- 85 000 ft<sup>2</sup> (7900 m<sup>2</sup>) facility inaugurated in 2015
  - 40 000 ft<sup>2</sup> (3700 m<sup>2</sup>) production floor (cell manufacturing)
  - 4600 ft<sup>2</sup> (430 m<sup>2</sup>) R&D labs (optic, electronic & testing)
  - 6000 ft<sup>2</sup> (560 m<sup>2</sup>) aerospace manufacturing clean rooms



# Current hardware in space

100+ cumulative years of discoveries!



Mechanisms cumulating 2.9 billions mirror scans in orbit.

Currently under contract for optical systems for **32 more satellites**



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# TWINKLE

A proposed UK-lead space mission

## Science cases

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- Infrared spectroscopic characterization of the atmospheres of exoplanets
  - Hot Jupiters
  - Sub-Neptunes
  - Super-Earths
  - Stars & Brown Dwarfs
- Surface composition of thousands of small bodies within our Solar System to learn more about the its formation and evolution

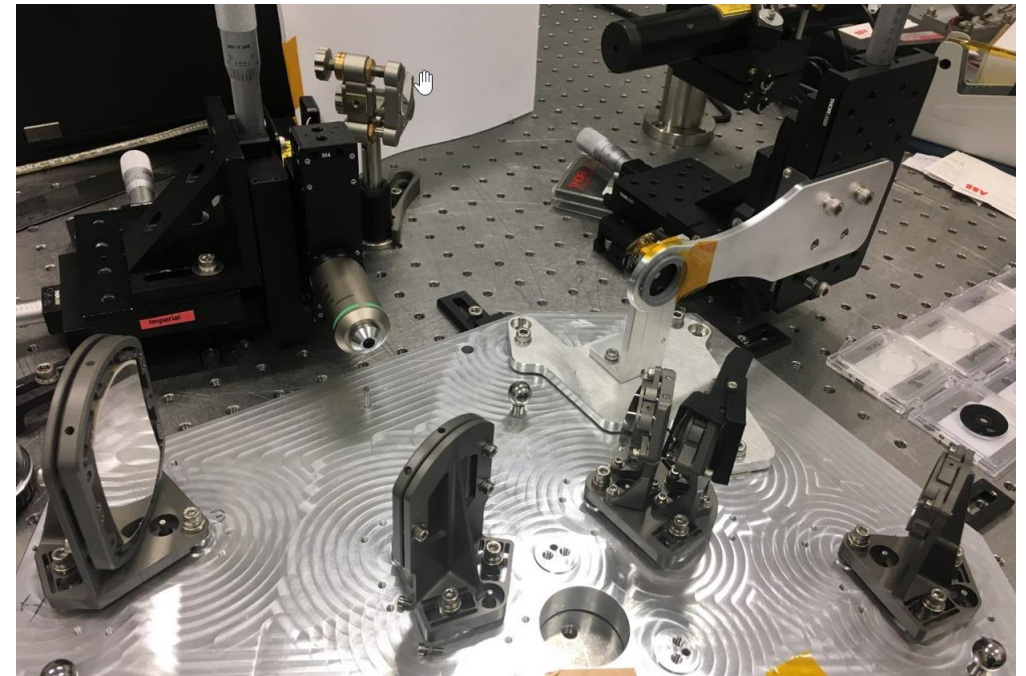
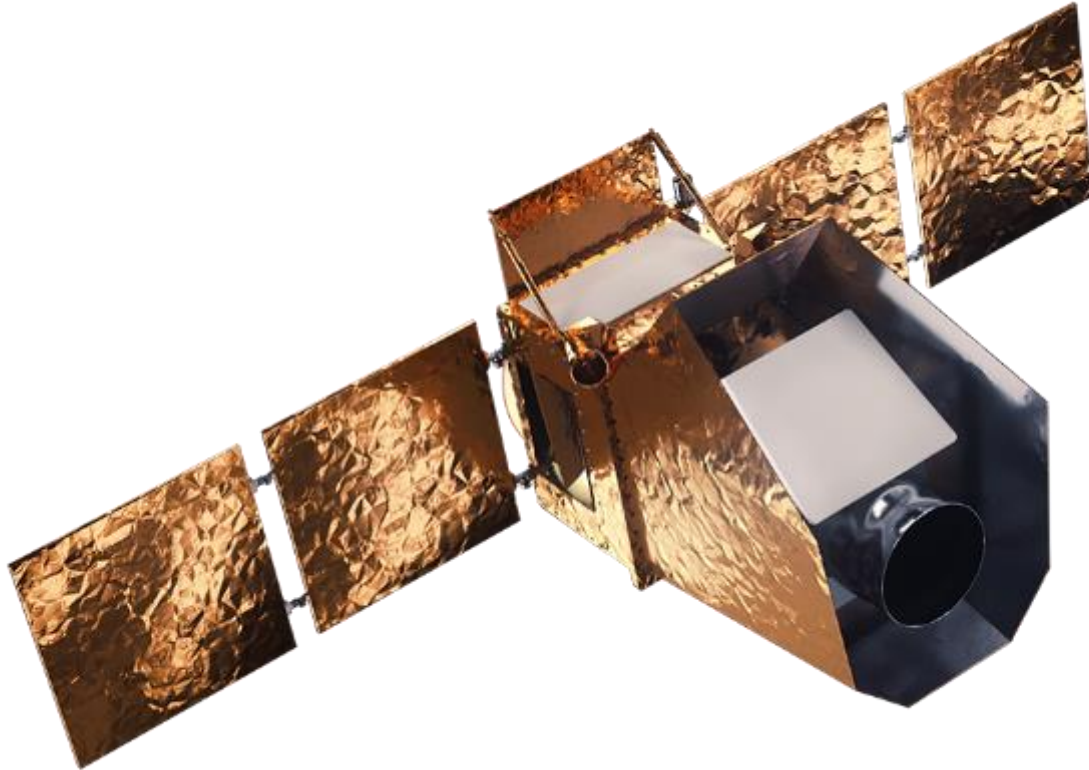
## Telescope main technical specifications

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Primary mirror	45 cm Ø
Field of view	20 × 20 arcsec
Spectral range	500 – 2400 nm (Ch1) 2400 – 4500 nm (Ch2)

# TWINKLE

A proposed UK-lead space mission



2-Channel low resolution dispersive spectrometer  
baselined

# POET – Photometric Observations of Exoplanet Transits

A proposed Canadian space mission

## Science cases

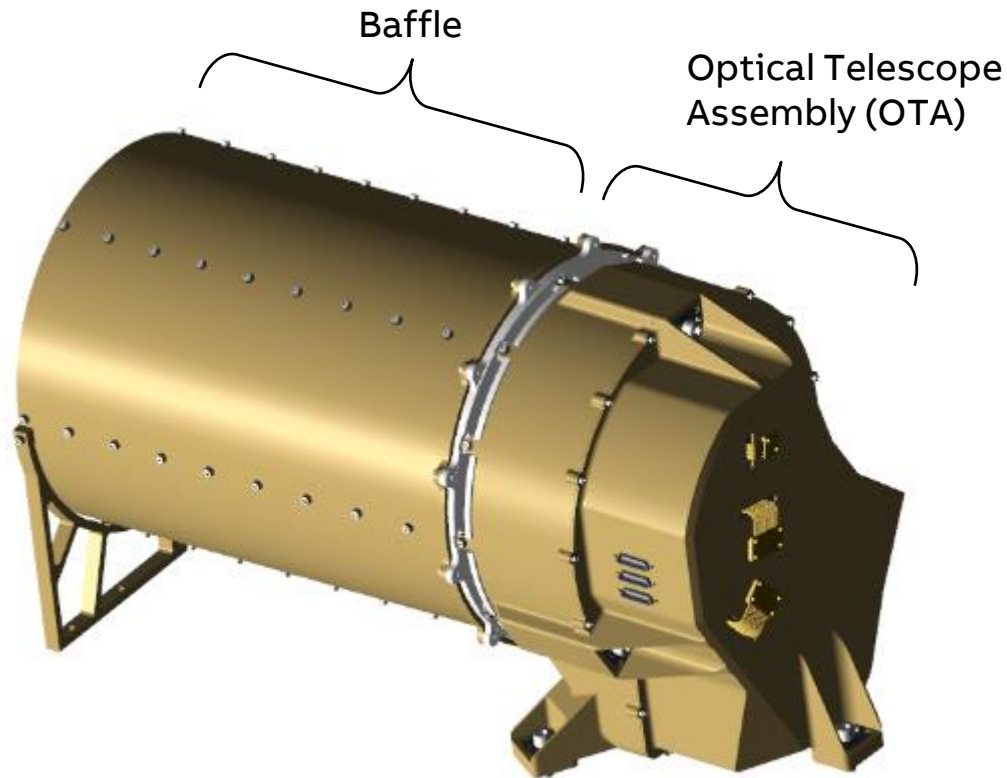
- Detect new, potentially habitable, rocky planets transiting low-mass stars
- Characterize the atmospheres of known transitioning extrasolar planets

## Telescope main technical specifications

Aperture	20 cm Ø
Field of view	0.9° × 0.9°
Wavebands	300 – 400 nm (u-band) 700 – 900 nm (VNIR) 1100 – 1300 nm (SWIR)
Operational temperature range	-20°C to 20°C
Mass	5.25 kg

# POET – Photometric Observations of Exoplanet Transits

A proposed Canadian space mission



Preliminary optical head design

## Thanks to CSA's STDP program...

- ✓ Fully design the OTA and a preliminary mechanical and electronics concept
- ✓ Built the OTA
- ✓ Test the OTA's optical performances
- ✓ *Perform a thermo-vacuum campaign on the OTA over the operation and survival temperature ranges*

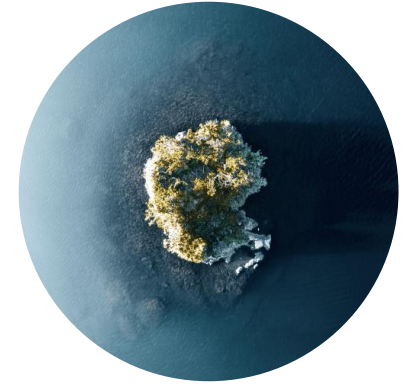
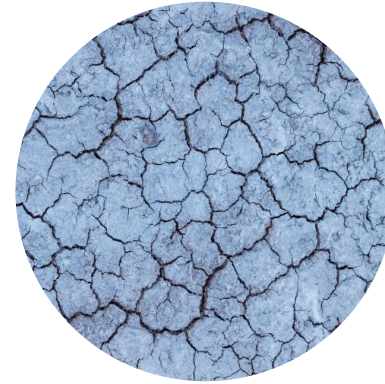
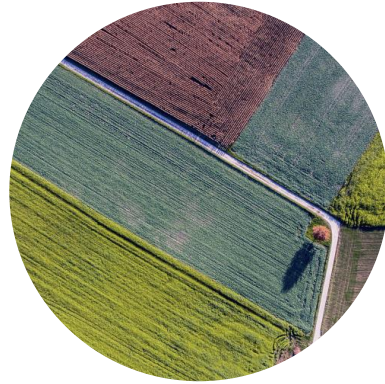


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# Hydrosat

Infrared enabled analytics for climate and agriculture

- Crop yield
- Drought Prediction
- Water Resource Management
- Urban Heat Mapping
- Wildfire Prediction and Monitoring  
and more...



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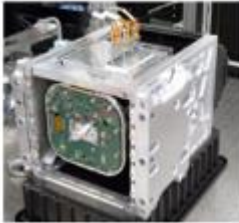
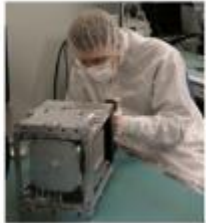


ABB delivered the first TIR imager in December 2023  
Launch is planned for 2024

# Hydrosat

Infrared enabled analytics for climate and agriculture

**High-resolution thermal imagery.**  
Every day, everywhere.



**ABB HSAT Project Team**

Project Team at 3400: Pierre-Ardoain, Quebec, Canada: Anick Gravel, Asma Ben Khalifa, Charles Fortin, Danny LeBreux, Derek Hansen, Dominic Tremblay, Dominique Bodziary, Eric Carbonneau, Eric Dube, Eric Smith, Etienne Gauthier, Fabien Lafosse, Francois Tanguay, Frederic Boyer, Frederic Doyon, Genevieve Delisle, Germain Hebert, Guillaume Theriault, Guy Bonsaint, Hatem Leff, Hugo Bourque, Ian Silversides, Jacques Giroux, Jean-Alexis Boulet, Jean-Francois Cloutier, Jean-Thomas Landry, Jean-Yves Trostler, Jeremy Papinet, Joel Tourigny, Josee Racine, Julie Bergeron, Julie Soyavong, Karine Veilleux, Karl Lafontaine, Keven Bohvin, Khouloud Amara, Laurent Lacombe, Louis Moreau, Louis-Philippe Bibeau, Lucie Veilleux, Marie-Eve Duplain, Martin Dubuc, Martin Larouche, Maryse Beauchemin, Mathieu Malsonneuve, Mathieu Pouliot, Maxime Lupien, Michel Duchesne, Michel Roux, Mikael Zubelwisch, Mohamed Le Mehdil Gougouag, Nicolas Etienne, Oscar Bernat, Pascal-Emmanuel Lachance, Patrick Gilbert, Philippe Cote, Philippe Tremblay, Raphael Gosselin, Richard Houde, Richard Lajoie, Richard-Luc Lachance, Robert Bouchard, Samuel Lermieux, Sebastien Jugin-Langlois, Sergio Pereira, Siham Kerzouz, Simon Bastien, Simon Houde, Stephane Lantagne, Stephane Lemelin, Steve Levesque, Vanessa Livernoche, Veronique Laterreur, Vincent Renaud, Vintcius Albanas Marcis, Willem Grand-Maison, Yoann Bussan



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# Enabling the greatest discoveries



**ABB**