Canadian Stratospheric Balloon Program Overview

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Agence spatiale canadienne | Canadian Space Agency

Canada

CSA's Stratospheric Balloon Program

Advance
Science and Technology

Training and Education

Ballooning in Canada

Historical

- Involved since the 1950's
- 1998–2004: balloon missions to study stratospheric composition

Current

- 2012–today: **STRATOS – CSA's Stratospheric Balloon Program**
- Long-standing CSA-CNES collaboration agreement
- Canadian Balloon Base in Timmins, Ontario
- Flying payloads in Canada and abroad
- Committed HEMERA Partner!

STRATO SCIENCE 2014 · STRATO SCIENCE 2015 · KASA 2016 · AUSTRAL 2017 · Strato Science 20/18 · Strato Science 2019 · HEMERA KLIMAT 2021 cnes · HEMERA 2022 Strato Science cnes

Campaigns and International Collaboration in Canada

- **Campaigns**: **5** (2014 | 2015 | 2018 | 2019 | 2022)
  - **ZPB launches**: **28**
  - **Instruments flown**: **70**
  - **Participants**: **700+** (scientists & students)
- **Largest envelope**: **800,000 m^3**
- **Heaviest payload**: **1,100 kg**
- **Longest flight**: **33 hrs**

No flights ever scrubbed

Track record: 100%

Canadian Balloon Launch Base (1/4)

Mid Latitude (700km north of Toronto)

- Latitude: 48° 34’ 11’’ N
- Longitude: 81° 22’ 36’’ W

Base infrastructure

- Flight Control Centre / Flight Chain Preparation
- Payload Lab / Integration Hall
- Garage

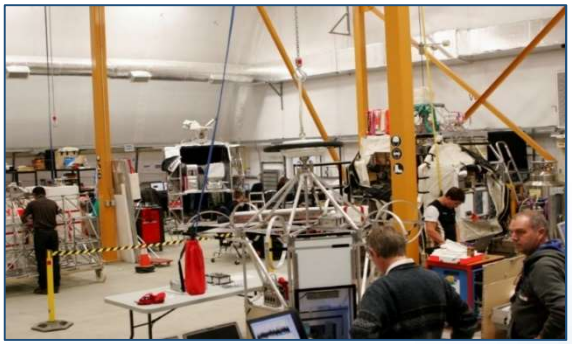
Canadian Balloon Launch Base (2/4)

Future Outlook

- Continue medium duration flights (30+ hrs)
- More short duration flights (1/2-day)
- Support transatlantic flights (thru payload recovery)
- An additional payload integration hall

  * Leverage use of Stratospheric Expandable Balloon (SEB)

	Existing Integration Hall 1	**2023 Addition** Integration Hall 2
Floor Area	320 m^2	320 m^2
Crane	**2t** overhead **1t** jib	**4t** overhead
Power	**110V** (North American)	**110V** (North American) **220V** (European)



Canadian Balloon Launch Base (3/4)

- Leave no payload/envelope behind
- All for one and one for all - we recover it all
- Payloads returned to you in great shape

No payload ever not recovered
Track record: 100%

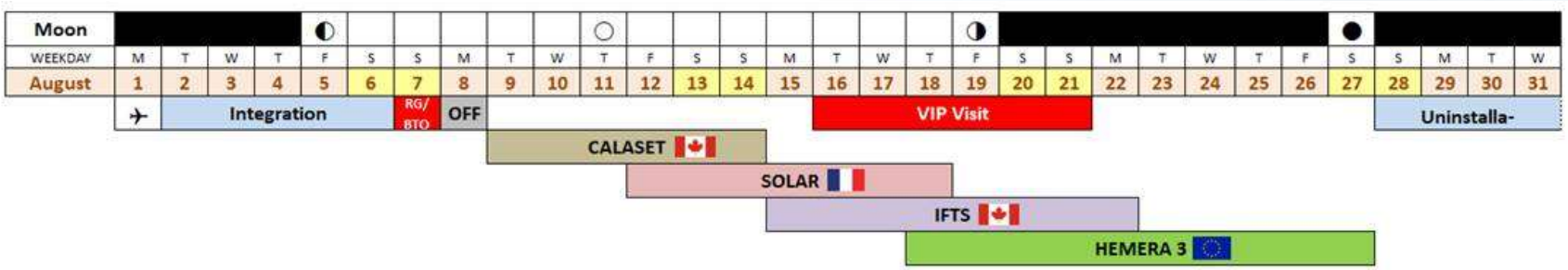



Canadian Balloon Launch Base (4/4)

Science	Entity	Years Flown	Payload (# of times flown)
Atmospheric Science	U. Saskatchewan	2014, 2017, 2019, 2021, 2022	ALI(4); LIFE(1); OSIRIS(1)
	U. Toronto	2014, 2015, 2019, 2022	PARABLE(2); CALASET(2); CALASET NG(1)
	York U.	2014, 2015, 2016, 2017, 2022	PARABLE(2); SHOW(1); RSOnar(1); Imaging FP-Spectrometer(1)
	U. Saskatchewan ABB; CSA	2022	iFTS(1)
Imaging	DEEP Inc.	2015	DEEP (immersive)(1)
	DRDC Valcartier	2021, 2022	HIPTA(2)
	Sherbrooke cégep	2019, 2022	HABLAN(1); HABLAN-II(1)
Astronomy	U. Toronto	2014, 2015, 2019	BIT(2); SuperBIT(1)
	U. Laval	2018	HiCIBaS(1)
Solar-Terrestrial	U. Alberta	2014	CABARET(1)
Novel Technology	Stratodynamics	2019	Hidron(1)

2022 Strato-Science Campaign in Canada

- **Date**: August 1st - 31st
- **Flights**: 4 ZPB flights (one HEMERA flight) and 6 SEB flights
- **Payloads**: 18
- **Participants**: 160+ (78 Europeans and 85 Canadians)



Stratospheric Expandable Balloons (SEB)

Canadian Payloads

Instrument	Mass
iFTS	110 kg
CALASET	70 kg
CALASET NG	60 kg
HIPTA	40 kg
ALI	36 kg
HABLAN II	7 kg
RSOnar	3 kg

SEB Advantages

- Payloads up to 6.5kg (possibly up to 10kg)
- 3-hrs flight duration
- Low cost, simple logistics, fast mobilization
- Complements ZPB for increased science output
- Controlled termination possible

HEMERA Payloads

Instrument	Mass
GLORIA	125 kg
CorMag	106 kg
FIRMOS	85 kg
TotalBRO	37 kg
GRASS II	9 kg
ECAPS	4 kg
AIRE	2 kg

The Stratodynamics Success Story!

- **The Payload**: HiDRON is a semi-autonomous glider that carries instruments for atmospheric data collection at high altitude.
- **The Success Story**: With the successful demo flight released from a stratospheric balloon in August 2019, the company received their first contract from NASA in November 2019.

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