INSAT

Initiative for sustainable aviation technology

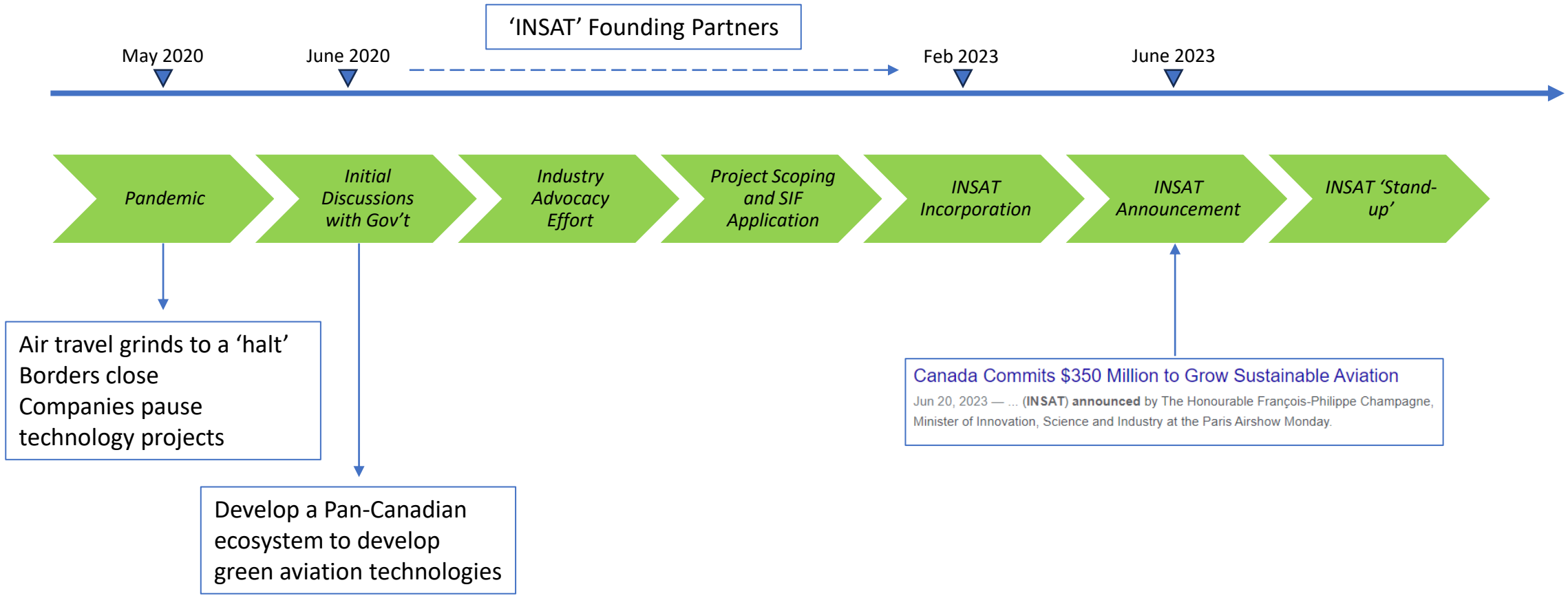
Canadian Hybrid Electric Prototype

Supported by

Innovation, Science and Economic Development Canada

*Initiative for Sustainable Aviation Technology™
**Initiative pour une technologie aéronautique durable™

Genesis and Timeline to INSAT



Executive Summary

On June 19, 2023, the Canadian Government announced a $350M investment into a national sustainable aviation innovation network

INSAT was created to administer and allocate these funds

INSAT will fund eligible sustainable aviation technology projects in Canada

Projects must include at least two collaborators (industry and/or academic); one of which must be an SME*

Technology range: TRL 3-7 (TRL 2 in exceptional cases)

Funding level: up to 40% of eligible costs (up to 50% in exceptional cases; up to 100% for academic collaborators)

Governance structure: independent, transparent and scalable

*SME means small- and medium-sized enterprise(s) with less than 500 full-time employees

Opportunity

Global 2050 targets for mitigated CO2 growth to benefit climate change

Air travel growth is outpacing aircraft emissions improvements

ICAO predicts global aviation emissions could triple by 2050

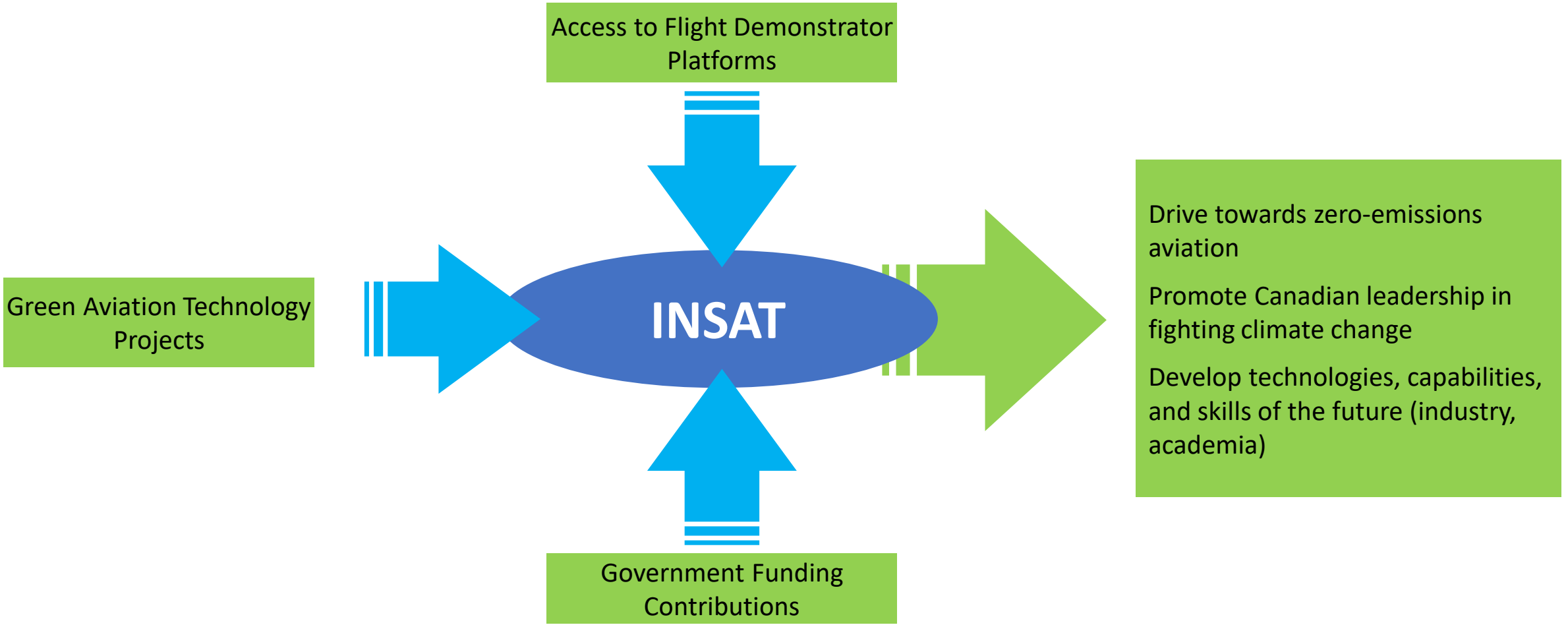
A paradigm shift is needed through technology injection, clean fuels, and operational improvements

Canada can be a leader, with a diverse aerospace sector, a wealth of natural resources, and world-class talent

Success is tied to a strong industry-led partnership with government to unlock the full potential of Canada's strengths

Credit ICAO

Expedite Aviation to *Net-Zero Emissions*



Mission: Coordinate and accelerate the development of green aviation technologies in Canada

Founding Members & INSAT Accessibility

Founding Members

Interim Operations

The founding members on INSAT's interim board and tasked to stand-up operations

The interim board will transition to a permanent board as soon as practical, at which time operations will become independent of the founding members

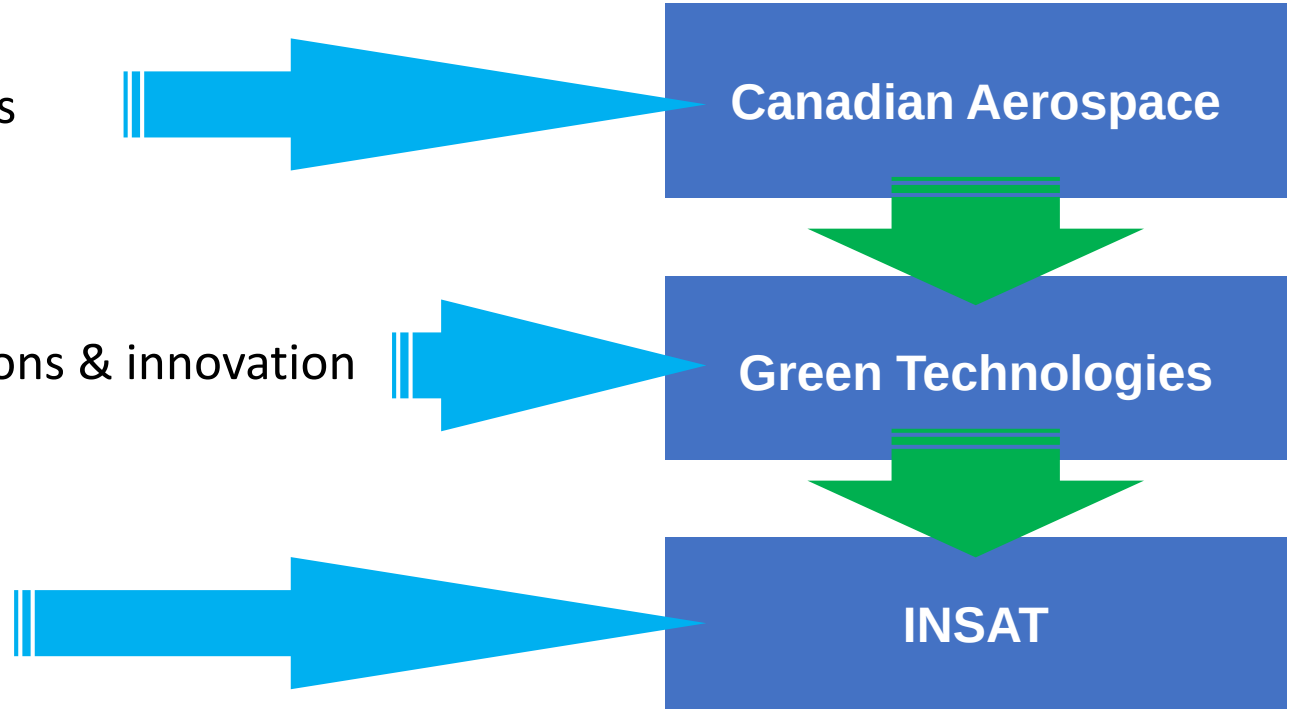
Permanent Operations: founding members become regular members without special privilege; **INSAT is accessible to the entire Canadian aerospace ecosystem**

SIF Stream 5 – National Ecosystems

Tailored for large-scale ecosystems

Promotes high-impact collaborations & innovation

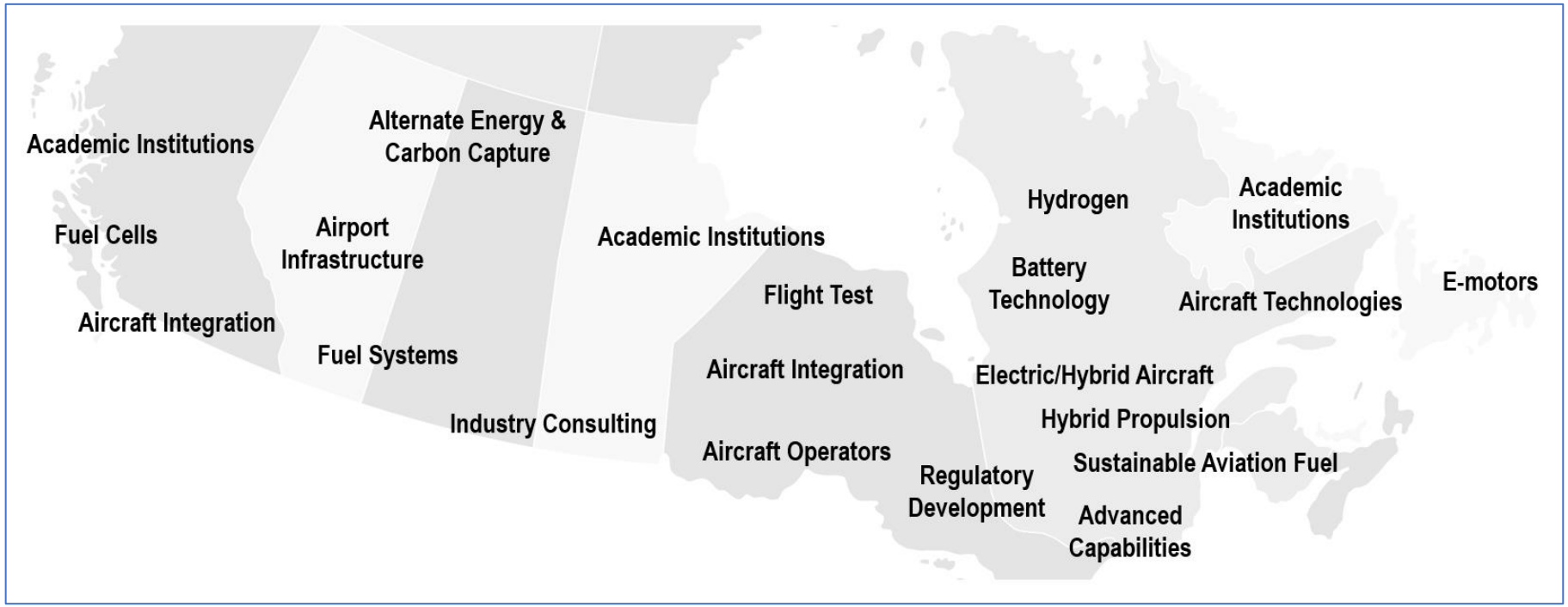
Funds pan-Canadian consortia



Pillars for a Pan-Canadian Ecosystem

INSAT Pillars

	1	2	3	4
	Hybrid/Alternate Propulsion	Aircraft Architectures & Systems	Clean Fuels Transition (SAF, Hydrogen)	Infrastructure & Operations
Investment/Support				
Collaboration				
People/skills				
Intellectual Property				



NRC Hybrid-Electric Aircraft Test-bed

Key words:
Sustainability
Roadmap to Net-Zero emissions

Vision - To expedite Canadian aerospace towards environmental sustainability

Mission - To coordinate and accelerate the development of green aviation technologies in Canada

Sectors/Collaboration

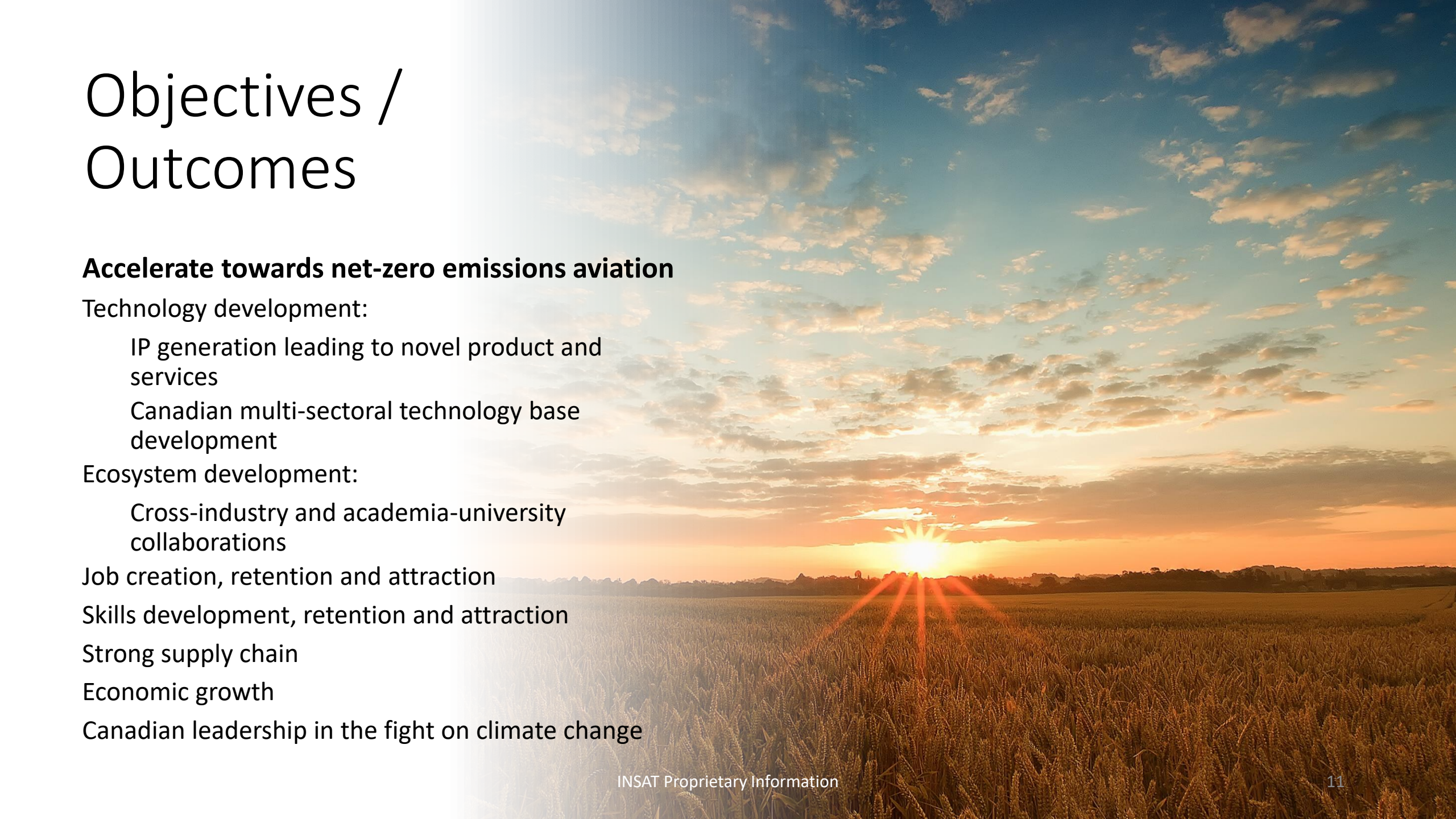
Aerospace products and services

Airlines and airports

Conventional aviation and Advanced Air Mobility.

In conjunction with adjacent sectors such as transportation, energy, and IT

Objectives / Outcomes



Accelerate towards net-zero emissions aviation

Technology development:

- IP generation leading to novel product and services
- Canadian multi-sectoral technology base development

Ecosystem development:

- Cross-industry and academia-university collaborations

Job creation, retention and attraction

Skills development, retention and attraction

Strong supply chain

Economic growth

Canadian leadership in the fight on climate change

Crossover Innovation

Transportation, energy and IT:

- Electrification of transportation
- Electric- and hybrid-electric propulsion
- Sustainable energy and fuels
- Hydrogen technology development
- Certifiable batteries
- Artificial Intelligence for aerospace
- Etc.

Building a Canadian Ecosystem to drive sustainable aviation R&D

INSAT Pillars

1 Hybrid/Alternate Propulsion

- New thermal cycles
- Hybrid-electric propulsion
- Electric powertrains
- Battery and fuel-cell systems
- New propulsion configurations

2 Aircraft Architectures & Systems

- Aircraft configuration and aerodynamics
- Systems architecture for efficient aircraft
- Electrification of systems
- Lightweight structures and design
- Simulation and designs
- Green manufacturing

3 Clean Fuels Transition (SAF, Hydrogen)

- Sustainable aviation fuels (SAF)
- Hydrogen fuel
- Other alternative fuels
- Liquefaction and compression of hydrogen

4 Infrastructure & Operations

- Airport infrastructure
- Hydrogen transport & storage
- Hybrid testing facilities development
- Operations automation
- Artificial intelligence

Technology Integration & Environmental Impact

INSAT Activities

1. Technology Projects:
    - 1.1 Technology Development
    - 1.2 Access to Flight Demonstration Platforms
    - 1.3 Environmental Assessment
    - 1.4 Commercial Applicability and Potential
2. National Ecosystem Development:
    - 2.1 Outreach Activities
    - 2.2 Skills Development
    - 2.3 Small Enterprises Outreach and Mobilization
3. INSAT Administration and Operations

INSAT Entity

- Not-for-Profit entity
  - Director General + five Directors
- Board of Directors (BoD)
- BoD Sub-Committees
  - Strategy
  - Finance
  - Business Development
  - HR / Governance
  - IP / Legal
- Independent Project Selection Committee

Membership

Organization Size	Enterprise	University/College Research Centres
Very small (under 10)	$250	$250
Small (10-500)	$500	
Intermediate (500-1000)	$2500	
Large (>1000)	$5000	
Associates (free)		

Conditions for Projects

The Main Applicant must become a INSAT Member

The project criteria:

- Step toward net-zero emissions aviation
- Realistic path toward commercialization
- TRL range 3-7
- Result in at least an increase of one TRL
- Involve at least one SME
- Maximum three years in duration

NOTE: No single project is expected to deliver Net-Zero

INSAT Grant Parameters

Maximum eligible expenses : 20M$

Re-imbursement level: up to 40%

Overhead on salaries: ceiling of 55%

Governmental stacking limit: 75%

Maximum project duration: 3 years

Expenses must be incurred in Canada except for equipment (conditions and limits apply)

INSAT membership compulsory

Service fee of 4% apply to funded projects

Selection Criteria

- Ability to deliver and implement
  - Applicants and Governance
  - Technical Content
  - Work Breakdown Structure
  - IP Strategy
- Alignment with INSAT raison d’être
  - Accelerate technology for Net-Zero
  - Benefits to Canadian Ecosystem

Steps

Step 1.	Introduce INSAT to larger audience	Webinar 11 Jan 2024
Step 2.	**Application.** Fill-in the INSAT application template and provide the commitment letters. The INSAT Team will assist you putting the document together. (www.insat.aero)	26 Feb 2024
Step 3.	**Evaluation.** Once deemed ready by the INSAT Team, your project is submitted for evaluation by the Independent Project Selection Committee. Evaluation process commences.	4 March 2024
Step 4.	**Approval.** For successful projects, Selection Committee makes recommendations for Board of Director approval.	April BOD Meeting
Step 5.	**Master Project Agreement (MPA) signed.** Contract finalized and signed. ***IP framework*** among partners agreed.	4-6 weeks
Step 6.	**Start.** Once agreement reached, the contract is signed, and the project begins. **Clock starts for 90 day *IP agreement* between partners**.	Project Announcement & Go

Project Selection Committee convenes 4 times a year

INSAT Project Submission Template

Main body

- Executive Summary
- Applicants
- Technical Description
- Work Breakdown Structure
- Governance
- IP Strategy
- Expenditures and Contributions Breakdown
- Benefits

Annexes

- Letters of commitment (one per partner involved, including other funding organizations)

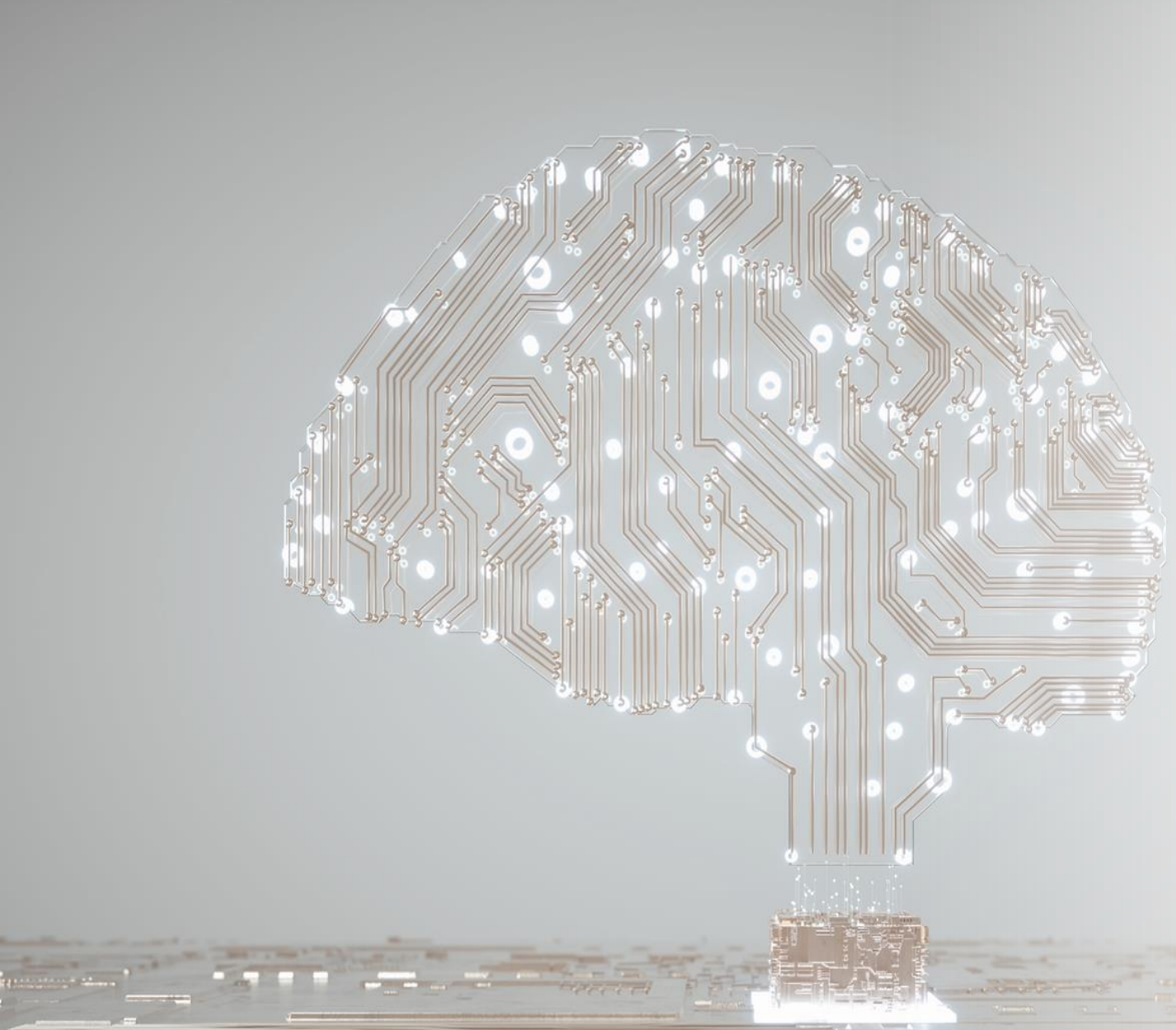
INSAT Responsibilities

The INSAT Team has the responsibility to:

- Ensure that projects are eligible and meet INSAT requirements
- Perform a basic due diligence on the project teams
- Assist the project teams developing of their proposal
- Ensure the eligible costs are reasonable

The Evaluation Committee is independent from the BoD and the INSAT Team.

The Evaluation Committee makes funding approval recommendations to the BoD.



INSAT Projects IP

Objective – Ensure participants can implement results to have impact on net-zero emissions targets:

- Plan for intellectual property assets use
- Protect their innovations
- Develop an IP strategy that is aligned with their business.

IP Requirements:

- The parties have an agreement that addresses ownership/access of IP assets generated during a project.
- General IP Framework must be in place at contract signature.
- Formal IP agreements must be put into place 90 days after contract signature.
- **No expenditures will be refunded in the absence of formal IP agreements.**

Support and Contact Information

(under construction)

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Website

www.INSAT.aero

LinkedIn

INSAT Aero

Questions submitted pre-webinar

	Question	Answer
1	When is the next application deadline?	March 4, 2024
2	Can a research center be a lead applicant?	Yes (non-governmental research center), at a minimum one of the partners must be an SME
3	What is the minimum duration of a project?.	There is no minimum. Maximum is 3 years.
4	What are the eligible expenses?.	Will be communicated outside the webinar.
5	Number of partners per project?.	Minimum of 2. One must be an SME.
6	Partner commitment ratio?	Expectation that partners are committed, and not “in name” only
7	What is the minimum project size ($)?	There is no minimum
8	Will partner assistance/support be provided (networking, finding partners, etc.)?	INSAT can assist with this support, through member connections, ecosystem networking
9	What is the process and timeframe between submission and start of work? What is the calendar?	Discussed in the presentation
10	When will the forms for the 4 components be available?	They are already on the Website
11	How can I become a member?	INSAT is working to have membership through the INSAT.aero website. It is not currently available.
12	Do I need to be a member to submit a project?	Yes.
13	MPA (Master Project Agreement): is it possible to know/see the contract before deciding to submit a project?	The MPA is in final iteration and can be provided in some form once available.

Thank you

Pictures are from the PowerPoint stock images, except:
Slide 1 – Pratt & Whitney Canada
Slide 9 – NRC