LRP2010

How did we fare?

(and some discussion points
for this workshop)

John Hutchings

LRPIC Nov 2018

Current cast of characters

LRPIC - M. Balogh, M. Dobbs, S. Ellison, J. Hutchings,
JJ Kavelaars, B. McNamara, N. Murray, I. Stairs.
Observers – R. Abraham, R. Kothes, J. Rowe, R. Thacker
Email list for open discussions: lrpic-discuss@lists.casca.ca

Other groups and individuals

Coalition for astronomy (Academia, CASCA, Industry) (currently Brooks, Thacker, Nelson)
Space Advisory Board to ISED ministry (Stojak et al)
Canada chief science advisor (Nemer)
CSA, NRC science advisors (Gallagher, Wayner)
CASCA lobbyists TSA (Rayner)
JCSA (CASCA-CSA) (currently Rowe, Hlozek, Haggard, Spencer, Willott, Heyl)

LRP2010
Abraham, Doyon, Kaiser, Kaspi, Pritchet (chair), Seaquist, Thacker
MTR2015
Balogh, Crampton, Dobbs, Spekkens, Krauss, Van Kerkwijk, Thacker (chair), Venn, Wilson
2017 Topical Team leads
Abraham, Gallo, Scott

Space Exploration Topical Teams 2017

Combined report by CSA

- Astrobiology;
- Planetary Atmospheres;
- Planetary Geology, Geophysics and Prospecting;
- Planetary Space Environment;
- **High Energy Astrophysics;**
- **Cosmology;**
- **Cosmic Origins;**
- Space Health.

LRP2010 table

SPACE	Large		Euclid/WFIRST	$100M:
	Medium	1	IXO	$15M:
		2	SPICA	$10M
	Small	1	Astro-H	$5M:
		2	Balloon	$5M:
		3	Microsatellite	$5M:
	Subtotal			**$140M:**

MTR2016 table

Space	Dark energy & surveys	100M
	CMB Polarization	20M
	Small payloads	5M
	Sub total	**125M**

Space	CASTOR[2]	TBD
	Athena	TBD
	SPICA	10M
	Small payloads	5M
	Sub total	**15M+TBD**

LRP
Project status
November 2018

What	When	Who	New $C	Share	Funds	Notes
TMT	2019-2025?	TIO partners	TBD	~15%	GoC, NRC	$243M April 2015. Constr 2019? CFI funds were key in early stages
SKA	2016-2024	Consortium of 11	~$60M	6%?	NRC, GoC	Phase 1. Cost, treaty issues +$ (large) SKA1 start 2019?
WFIRST	2018-2025	NASA	$0	None?	CSA	IFC descoped, partnership aborted
CASTOR	2019-2026?	CSA + JPL + ISRO + UK?	$200m?	45%?	CSA	Tech + science studies; partners Sci maturation study 2018
MSE	2017-2026?	Can, Fr, China, India, Aus, (NOAO, TA&M,Spain)	$65m?	~17%	Current, CFI?	Hosted at CFHT. Partnership CoDR Jan 2018, PDR requires SOU
CCAT-p	2017-2022	Consortium	$9m	20%	CFI	6m wide field. University leads
CHIME	2013-	UBC, UT, McGill	--	100%	CFI x2	Operating. Pulsar, FRB new sci
SPICA	2018-2029?	JAXA+ESA	$40M?	10-15, team	CSA	HRS hardware. ESA M5 shortlist
LiteBIRD	2018-27	JAXA select dec	$34m	?	CSA	Bolometer system, SMS 2018
XRISM	2020 launch	JAXA, NASA	$1m?	Sci team	CSA	Filter calibration LRD 2020? Hitomi failure (CAMS)
Athena	2028 launch	ESA et al	$10m?	?	CSA	Co-chair of science panel Metrology hardware?
JCMT	2017-19	UK, Asian cons	$0.1m/yr	few%	??	Univ NSERC funds
Balloon, Microsat	2012-2020	CSA, CNES	$10M	100%	Current	Continuing

LRP space projects

(details in presentations at this workshop..)

-1. Euclid – no hardware, CFHT survey data
0. WFIRST: CSA studies, NASA review, terminated April 2018
1. CASTOR: tech studies, SMS now, partner participation
2. SPICA: CSA instrument, ESA mission approval 2021
3. LiteBIRD: Technology, contribution studies, SMS
4. Hitomi: CSA metrology, early mission failure, refly as XRISM
5. Athena: Canadians in team, contribution TBD
6. Newer CSA studies (exoplanet photom, Colibri. EPPE)

CSA has no funds or process to proceed with any of these
Lobbying with govt, SAB, etc: situation dire

Chasing opportunities down Daaark Energy hole

Top space thing in LRP2010

EUCLID: Attended meetings looking to join
Hardware essentially all sown up – too late
CADC and ground surveys explored
CSA have no funds and support abandoned
Membership for a few Canadians via CFIS.

WFIRST: not too late, CSA funded studies
Close collaboration with NASA
Hardware identified and costed
CSA have no funds and partnership fails

CASTOR: blue-UV survey substantial DE synergy.
Concept study and tech studies over several years
Current super-SMS in place of phase 0.
Potential partners involved; broad science
Await funding for CSA, partners.

A hard look at where we stand

- Existing LRP space projects need of order $300m over the next 12 years.
- New ones will appear (and existing ones may die?)
- Space astronomy needs a committed budget of $30m per year
- CSA needs to run its own program and manage its spending
- An overall budget of $100m per year for all space science will enable a broader program, and better control over spending profiles.
- The current paradigm of government micromanaging without process, knowledge, or consultation, is disastrous and unworthy.
- The current lack of a space science program is a national disgrace: one minor new astronomy partnership - CAMS - over the past ~decade.

Failure to achieve stable funding will

Lose earned opportunities
Lose our reputation with other agencies
Lose Canada's best scientists and engineers
Lose competitive expertise in Canadian high-tech industry
Fail to inspire the next generation
Fail to provide a public source of pride

<u>None of this is new – we have been saying this for years</u>
<u>*CSA wants us to help*</u>

The sad saga of political failure

<2017

- CSA space science budget systematically eroded.

2017

- Federal budget announces NEMO and QEYSSAT
  (without proper costing, schedule, or stakeholder process)
- Space Strategy is promised for June (still not produced)
- SAB appointed, consult, and urge space science budget
- Chief science advisor appointed (essentially invisible so far)
- Coalition pre-budget submission

2018

- Budget has no reference to CSA: no new projects announced
- Hence CSA cannot join WFIRST as negotiated (w/o scientists involved)
- Coalition lobbying visits to minister offices, not science advisor
- Coalition pre-budget submission

What were LRP problems and successes?

Successes

JWST partly - but was happening anyway.
CASTOR, WFIRST studies driven by LRP. Got us into Hitomi (CAMS).

Problems

Delays and inability to secure funding in a coherent and predictable way.
Inability to influence CSA funding.

What might we improve or change?

Be clear about benefits to
a) the entire community, b) excellence involving a few,
c) Canadian leadership and keeping the community competitive.
Realize and state that priorities may become obsolete at any time.
Define more active role/charter for LRPIC to deal with evolving situations?

Was it wise or useful to place arbitrary cost figures in tables?

Quoted costs in tables not justified and often wrong.

Note contingency, descope and walk-away considerations.

Note basis of cost estimates and contingency.

Also need to discuss operating costs and lifetimes.

No priorities beyond the few major ones: encourage ongoing competition for others?

How can the LRP be robust to funding and schedule uncertainties?

Don't assume hard dates, and expect delays.

Consider and suggest funding scenarios.

Dangerous to state times for exiting or going to plan B.

Descopes should be official project alternatives.

Look into a unified approach for funding large, medium projects?

Need to consider projects that will take more than a decade to happen.

Should the LRP state ranked priorities?

May cause only the top priorities to survive.

Should the LRP state conditions to proceeding or choosing projects?

Unpredictable events alter best choices as things evolve.
Need to monitor programs and changes as they happen (LRPIC).
New (or lost) opportunities may alter priorities.

Were LRPs too ambitious in the number and scope of facilities recommended?

Community support in jobs and funds to make full use of facilities?

Should LRP recommend:

ramping up/scaling back in some science areas?
developing key technical capabilities and data handling?
phasing out certain programs or facilities?

Should we note and work with other space science areas?

Our message…

1. Astronomy has a community-consensus decadal plan (LRP).
2. It represents our opportunities, expertise, and international reputation
3. Space astronomy is essential for frontier research and technology
4. **CSA needs to have committed long term funding and a mandate to manage it.**
   Current missions in study achievable with ~$30m/year for next decade

- At present the future of Canadian space astronomy is bleak.
- Piecewise mission-picking by the government ignores all the above.