

## LRPIC report to CASCA board December 2016

Core members - M. Balogh\* (Waterloo); M. Dobbs\* (McGill); J. Hutchings (Chair) (NRC Herzberg); JJ Kavelaars (CADC); B. McNamara (Waterloo); N. Murray (U Toronto); I. Stairs (UBC)

Observers - C. Wilson (McMaster U) (CASCA past-president); C. Heinke (U Alberta) (GAC chair); M. Sawicki (St Mary's U) (JCSA chair); R. Thacker (St Marys U) (MTRP chair); R. Abraham (CASCA president)

The committee also consults or reports to NRC (Greg Fahlman), ACURA (Don Brooks), CSA (Denis Laurin), and the Coalition for Astronomy (including Duncan Rayner).

The above lists have evolved since the last report, as roles have changed, and are updated on the CASCA website. JJ Kavelaars has been added to the core group to represent data issues.

The core members and observers have continued regular monthly telecons, and remain well-informed on the full range of LRP issues. The group has membership in, or strong connections with, most LRP missions. The following lists the most significant actions and concerns during the reporting period.

1. A committee was set up on short notice in September to advise the Canadian TIO board members on Canadian alternative site preferences for TMT. The members, selected by LRPIC and GAC, are S. Ellison (UVIC), L. Simard (NRC), P. Barmby (Western), M. Balogh (Waterloo), D. Lafreniere (U de M), N. Cowan (Mc Gill), R. Carlberg (Toronto). J. Hutchings acted as coordinator. Their report is posted separately and will not be repeated here. The group members have indicated willingness to continue to serve on TMT site issues if needed. The overall TMT situation involves overall funding, delays in resolving the Maunakea construction permit, and concerns over the ORM alternative site. The next few months are likely to be critical, and the committee will help where possible. **We regard full community engagement and consultation as essential in moving forward with an agreed plan.**
2. LRPIC supported CASCA and Coalition responses to the Government fundamental science review, the call for applications to serve on the new Space Advisory Group, and lobbying with the science ministers. These are all potentially important inputs to science policies and LRP funding for the future.
3. LRPIC had significant participation in the CSA space exploration workshop in November. It is noted that CSA are looking for a space science budget that can support the scope of the LRP future missions. This is a breakthrough in working collaboratively, and lobbying for what is needed. At present there is no committed mission beyond JWST, in spite of studies performed and under way for WFIRST, CASTOR, LiteBIRD, SPICA, and others. We have worked closely with the Topical Team leads (L. Gallo, D. Scott, and R. Abraham) in presenting a broad vision for space and LRP 2020. **Detailed input is essential to the government as they formulate the Space Plan that is to be announced in June 2017.**
4. The CSA space exploration program still lacks a mission that has major Canadian leadership and participation. The only candidate remains CASTOR, which **still awaits the phase 0 contract called for in the MTR**, to move forward with potential partners and detailed costing. Proposals for similar missions are emerging in the US and elsewhere, so the matter is now urgent. **We recommend that with the requested stable funding, that there be a Canadian-led mission approximately once per decade, in addition to the suite of minor shares in missions of other agencies.**
5. The SKA is continuing preparatory projects and holding meetings to discuss science plans. At the SKA Board meeting in late Nov. 2016, the Board directed the SKA Office to review the existing design and to implement cost-saving measures in order to bring the SKA1 project cost back in line with the originally approved cost cap. The intention is to preserve as much of the science capabilities as possible while possibly re-using some of the precursor and pathfinder technologies, and to maintain the current schedule of CDR in late 2017 and construction start in 2018. This directive does not, at this point, imply a new rebaselining. Agreement on the SKA IGO (which at this point will not include Canada as a treaty member) is still envisioned for the first half of 2017 with establishment of the SKA Observatory in mid-2018.

6. MSE's design phase continues to make good progress with partners Australia, Canada, China, France, India, Spain, and support from CFHT. The core staff of 7 is based at CFHT. There are very preliminary discussions of possible collaboration or partnership with ESO and LSST, which have potential impact on the LRP. Design studies are under way for the enclosure and telescope, and the project-wide design review is expected in mid-2017. A detailed schedule shows completion and commissioning in 2025, subject to approval of the new lease by 2019..
7. LRPIC continued to collect and monitor progress and issues in JCMT, CCAT, CHIME, in addition to those noted separately above. We work closely with GAC and JCSA by having their chairs as regular participants.
8. CANFAR (led by Falk Herwig) has submitted an LOI to a CANARIE call for Research Software Platforms. This will be to expand the capacity of CANFAR's software platform to support astronomy modelling-observation interaction. Details are being discussed by CANARIE Science Management Committee (SMC). A previous response by CANFAR to a CFI call was disqualified as it appeared to be NRC rather than a University-led. Falk is working to expand university researcher involvement in guiding the activities of CANFAR. CANFAR will need expanded data and computing allocations in the near future, and broader involvement of the university community will aid that goal.

We attach the usual table summarizing the current status of LRP projects. Some of the cost numbers are only rough guesses and should be taken as guidelines only, and are not at all official. The table, like the chart in the 2-page flyer in the last report, also does not indicate any levels of priority. It is clear that a number of new opportunities in space will need to be assessed soon.

### Nov 2016 status summary of LRP new projects

What	When	Who	New \$C	Share	Funds	Notes
TMT	2014-2020	TIO partners	TBD	~15%	GoC, NRC	\$243M Approved April 2015. Stalled CFI funds were key in early stages
SKA	2016-2024	Consortium	~\$60M	6%?	NRC...	Phase 1 Cost/scope issues +\$ (large) SKA2 for 2030
WFIRST	2016 - ?	NASA + JAXA + ESA	\$50M?	2.5%? Sci team	CSA	WFI phase 0, 2016 Science return TBD
CASTOR	2015-2022?	CSA + XSA	\$200m	33%?	CSA	Tech + science studies; partners Phase 0, Sci Def RFPs
MSE	2017-2025?	Can, Fr, China, India, Aus, Spain	>=\$34m?	~20%	Current +	Office, staff, at CFHT. Partnership design work to 2018
CCAT	2013-	Univ	\$20-30M?	15-25%	Current + ?	No CFI. Future uncertain
CHIME	2013-	UBC, UT, McG	--	100%	CFI x2	DRAO under way. Pulsar add-on
SPICA	2016-2022?	JAXA+ESA	\$20M?	?	CSA	FTS possible
LiteBIRD	>2017?	JAXA select	\$20M?	?	CSA	Bolometer read system
Astro-H	2012-2015	JAXA	--	5%	CSA	Launch + failure 2016. Cost ~\$8M
Athena	2028 launch	ESA et al	Long lead	?	CSA	Co-chair of science panel
JCMT	2014-16	UK, Asian cons	\$0.1m/yr	few%	??	Initial 2 years.
Balloon, Microsat	2012-2020	CSA, CNES	\$10M	100%	Current	Continuing

Funds indicated all spread over several years – details differ. **~\$350M new total**  
 Amounts secured or in present budgets. Space and Ground-based