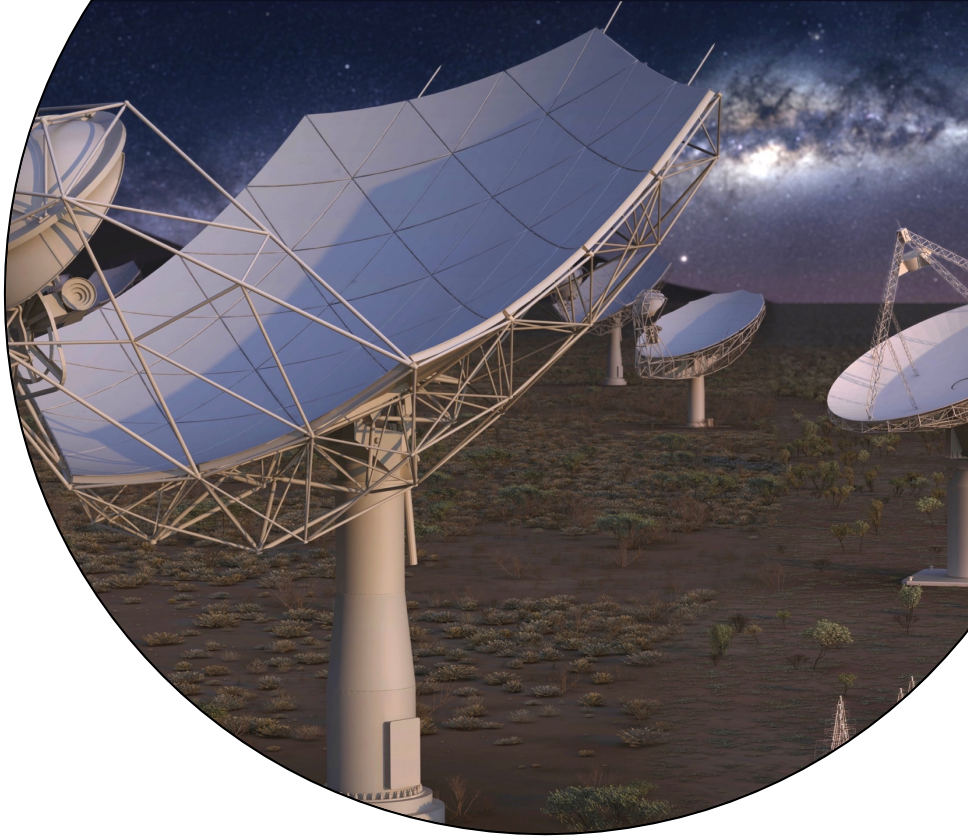
Exploring the Universe with the world's largest radio telescope



SRC Activities in Canada

Séverin Gaudet
CADC

SKA SQUARE KILOMETRE ARRAY CANADA

CIRADA
CANADIAN INITIATIVE FOR RADIO ASTRONOMY DATA ANALYSIS

CADC/CCDA
NRC·CNRC Canada

CANFAR

canarie

compute canada | calcul canada

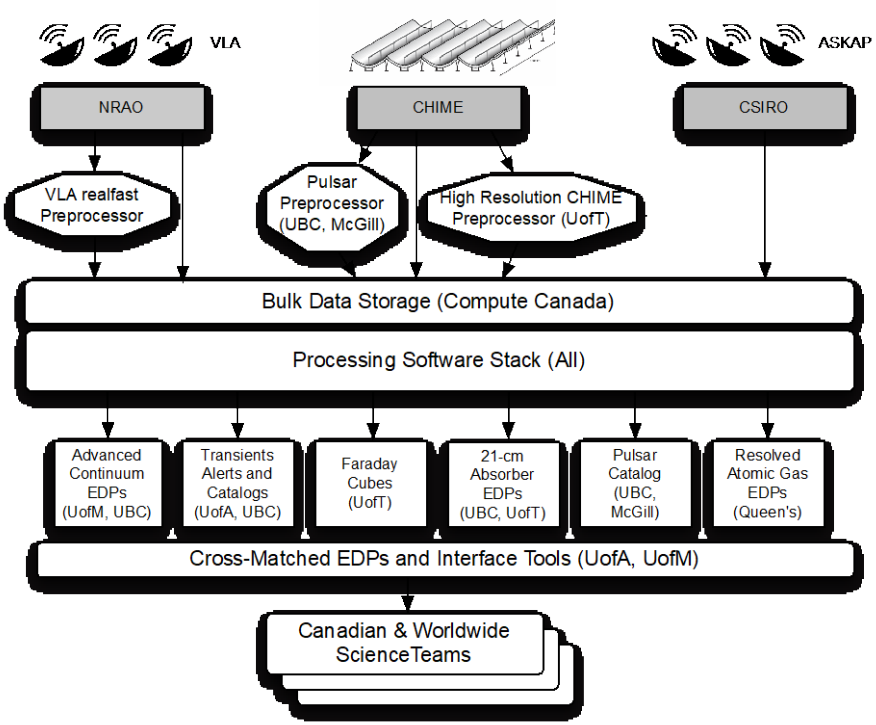
Last Time … Next Steps for SRC in Canada

A science data platform and archive development are areas of strength!

- ✓ Build upon the CIRADA, CADC and CANFAR activities
- ✓ Define a scientific vision for an SRC
  - Scope of activities
  - Share
  - Budget
- ✓ SRC recommendation to LRP
- ✓ Science data platform recommendation to LRP
- ✓ Continued participation in international SRC developments

CIRADA

- SRC pilot project
  - $10.6M for 5 years (2019–2024)
  - Building radio data capacity in six Canadian universities: Toronto, Alberta, McGill, Queen's, UBC, Manitoba
  - Advanced re-processing of basic observatory-generated data products using a unified processing software stack with cross-matches, advanced analytics and visualisation to produce enhanced data products (EDPs) for VLASS, CHIME and ASKAP surveys

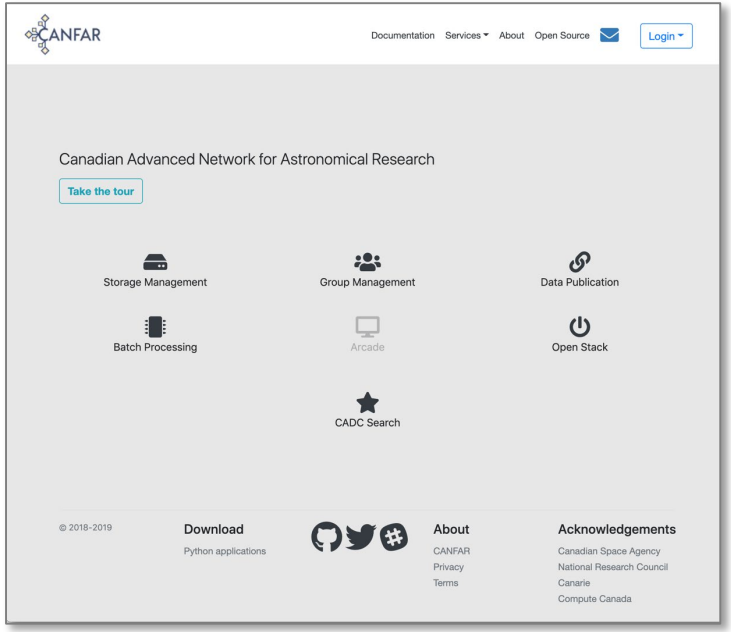


CADC

- National facility for open access
  - Hosting multiple missions, facilities and wavelengths
  - IVOA services on data
  - Development and operations hub for CANFAR
- Working with longer wavelengths
  - Evolving data models to support radio data
  - Adding VLASS, ASKAP, CHIME, DRAO and ALMA
  - Supporting CIRADA project

CANFAR

- A science platform for data intensive astronomy (2011)
  - Multiple services on federated cloud resources
  - Integrated A&A
  - User provided software
- Supporting CIRADA activities
  - scaling up infrastructure
  - Adding services



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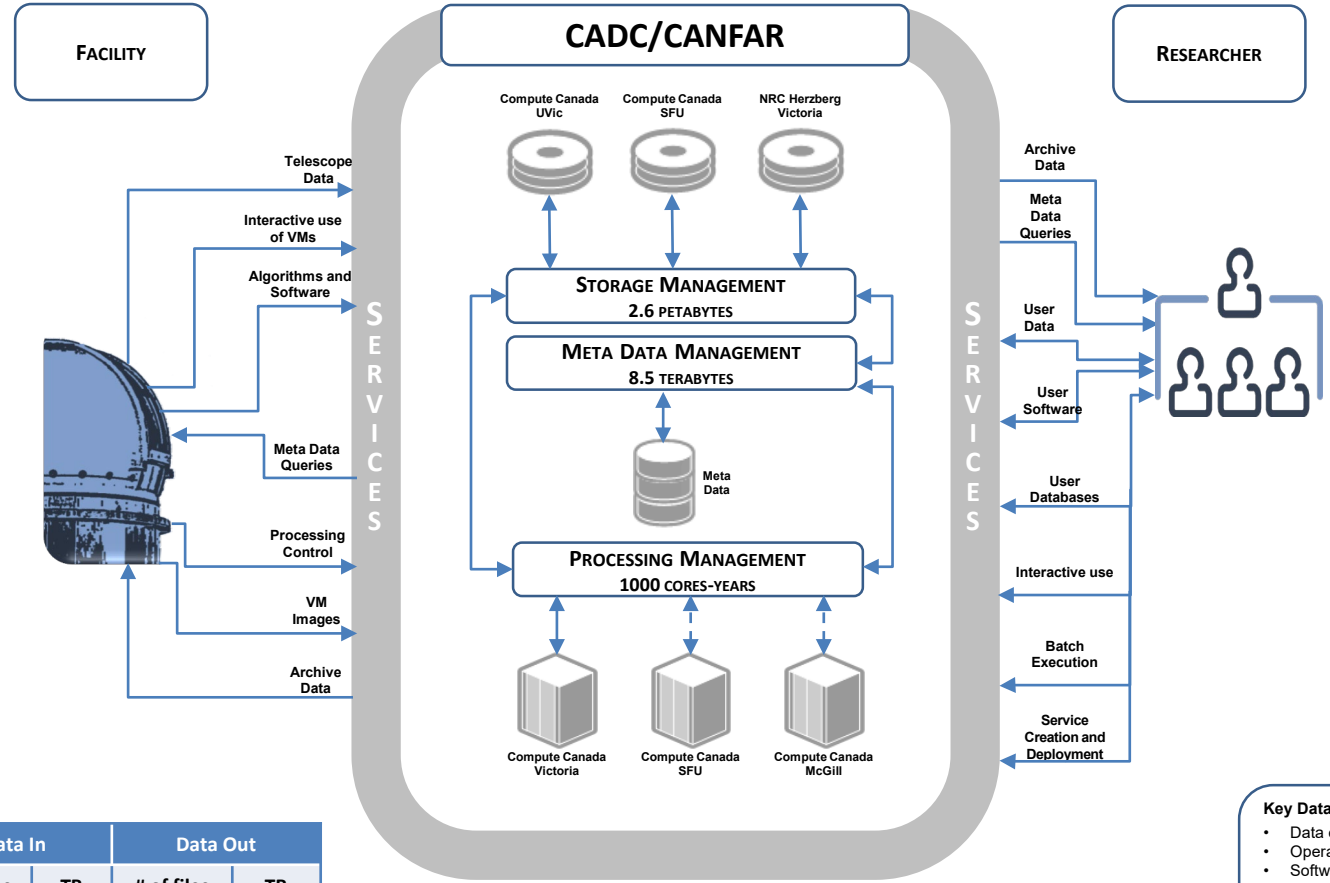


	Data In		Data Out	
	# of files	TB	# of files	TB
Peak per day	2,169,190	8.0	648,093	16.8
Avg per day	130,952	0.4	99,253	2.6

Key Data Activities

- Data engineering
- Operations and user support
- Software development
- Software integration
- Data processing
- Data management
- User web services
- User web interfaces

Canadian SKA Regional Centre

- A Canadian SRC Advisory Committee report (Sep 2019)
  - Scoping commensurate with Canadian scientific ambitions (Spekkens 2019; "Science Leadership Opportunities for SKA1 Key Science Projects: A Canadian Case Study")

Activity	Scenario 1	Scenario 2	Scenario 3
SRC Data Processing Share for PI Projects	6%	6%	8%
SRC Archive Hosting Share for PI Projects	6%	6%	8%
SRC Data Processing Share for KSPs	...	6%	8%
SRC Archive Hosting Share for KSPs	...	6%	8%
SKA Archive Data Processing	6%	6%	8%
Data Transport for SRC Alliance	100 Gbps	100 Gbps	100 Gbps
Contributed Effort for SRC Software Development	1 FTE	2 FTE	2 FTE
Contributed Effort for SRC Governance	0.1 FTE	0.25 FTE	0.25 FTE
Effort for dedicated support to Canadian SKA users	4.5 FTE	4.5 FTE	4.5 FTE
Education and Public Outreach	3%	3%	3%
Total cost (M$, over 10 years of ramp up)	24	45	55

Table 1. Summary of SRC Activity and Costing for Different Involvement Scenarios

Canadian SKA Regional Centre Report

- A Canadian SKA Regional Centre report (Sep 2019)
  - Costing of this participation estimated to be $45M CAD over the period 2021–2030
  - Requirements based on SRCCG, SRCSC and AENEAS reports
  - Costing with inputs from potential providers

	2021-2030 (Cumulative)	2031-2035 (Annual Average)
Cost	$45,400,000	$4,940,000
Processing	9.7 PFLOP-years	1.7 PFLOPs
Online Storage	237 PB-years	42 PB
Nearline Storage	654 PB-years	322 PB
Data Transport	100 Gbps	100 Gbps
Staffing	53.8 FTE-years	6.75 FTE
Travel	$1,100,000	$126,000
Education/Public Outreach	$400,000	$40,500

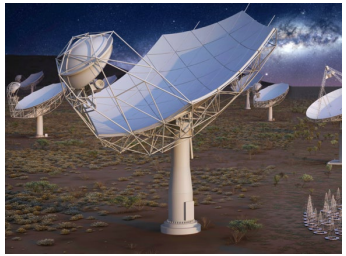
Canadian Long Range Plan 2020

SRC related-inputs to LRP2020 (Oct 2019)

SKA White Paper

Recommendation 2. Canada should participate in the SKA regional centre (SRC) network to ensure community access to the processing, storage and user support required to scientifically exploit SKA1. The cost of this participation at a level commensurate with Canadian scientific ambitions, and in accordance with SRC network guidelines, is estimated to be $45M CAD over the period 2021 – 2030 in addition to construction and operations funding. To meet its SKA1 compute needs, Canada should leverage its established strength in scientific computing platforms and archive development by hosting a Canadian SRC.

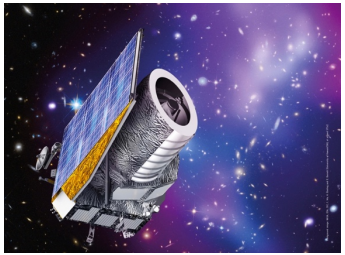
The Future Data Science Context for Canada



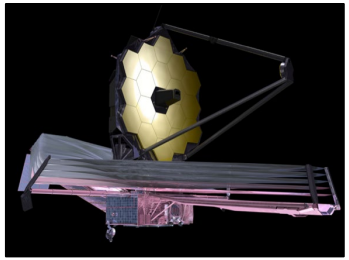
Radio: SKA

Radio: CHIME

Radio: GALT

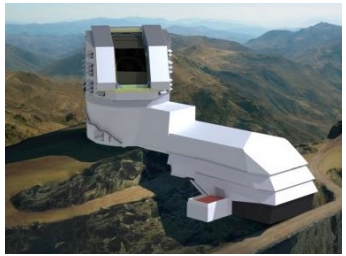


Optical survey: Euclid



Infrared: JWST

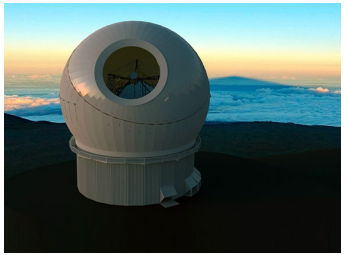
Mm/sub-mm: ALMA



Optical/Synoptic: LSST

Optical: TMT

Optical: TAOS II



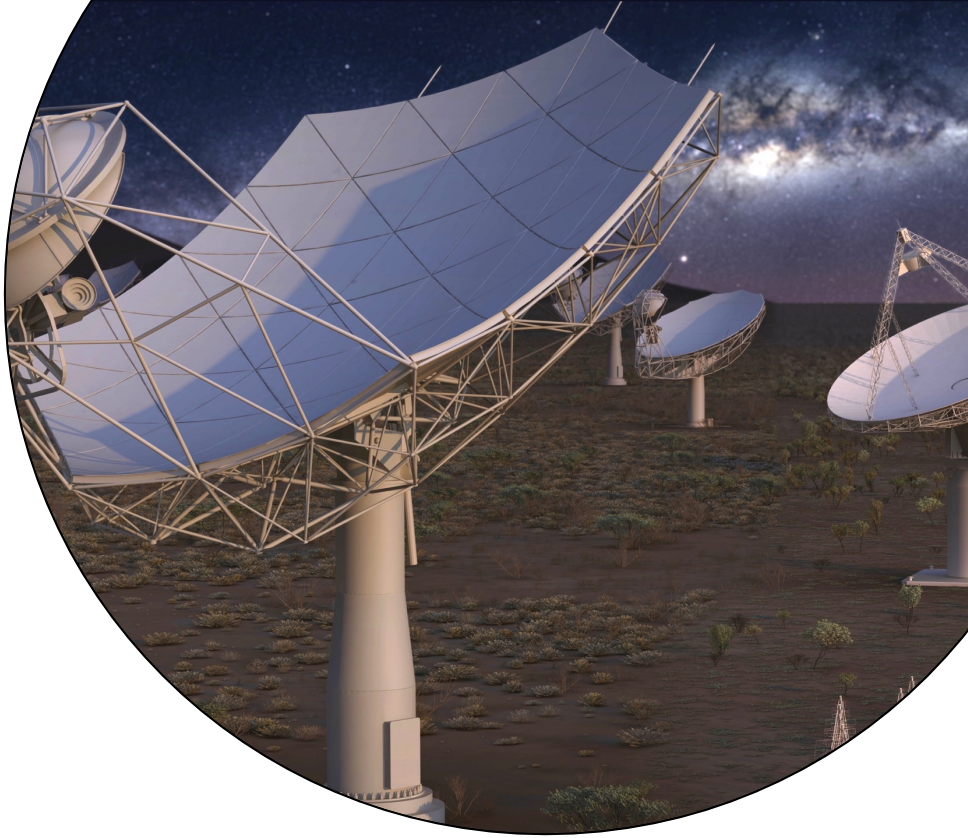
Optical: MSE

Canadian Long Range Plan 2020

SRC related-inputs to LRP2020 (Oct 2019)

Digital Research Infrastructure White Paper

> Recommendation 4: The dialogue and processes established in Recommendations 1,2,3 should lead to the creation of a formal entity (Canadian Astronomy Science Centre) to provide a bridging partnership between the various funders and actors in Canadian astronomy DRI and establish the capacity and breadth of mission needed to create and maintain a robust Digital Research Infrastructure in Astronomy.



Thank you

and

Thank you AENEAS

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