

Budget

Jeff Martin

TUCAN Collaboration

Budget sources

- Infrastructure:
 - TRIUMF matching funds.
 - CFI IF + provincial matching, 2017
 - JSPS support, 2018.
- Personnel, travel:
 - NSERC+CRC support \$651k/yr.
 - 4 postdocs, 10 grad students, undergrads, all our travel
 - CFI IOF support (ops+maint)
 - CFI IF, technical personnel.
 - 2 engineers, PM, 2 physicists.
 - JSPS
 - 2 postdocs, grad students from Nagoya
 - PI salaries covered fully by university or lab.

Partner	Cash (M\$)	In-kind (M\$)	Total (M\$)
Lead Institution+UBC (CFI)	5.0		5.0
Lead Institution (Research MB)	3.0		3.0
Lead Institution (internal)	0.3		0.3
KEK (internal)		0.35	0.35
RCNP (JSPS)		1.78	1.78
TRIUMF (internal)	1.2	0.4	1.6
UBC (BCKDF)	2.0		2.0
Industrial Partners		1.8	1.8
Total	11.50	4.33	15.83

Budget concerns

- JSPS grant smaller than anticipated in original CFI request.
- Many items on interface between Japanese and Canadian parts not included in original budget.
- TRIUMF advises to “create contingency”, and “contingency board”.

UCN Source Budget

CFI Budget Without Contingency		Cash \$			In-Kind \$			Total \$		
Item #	Item Description	CFI Sept 2019	Current	Change	CFI Sept 2019	Current	Change	CFI Sept 2019	Current	Change
1	UCN Source Upgrade	\$ 1.430	\$ 2.346	\$ 0.916	\$ 1.590	\$ 0.942	\$ (0.648)	\$ 3.020	\$ 3.287	\$ 0.267
1a	LD2 moderator upgrade	\$ 0.900	\$ 0.625	\$ (0.275)	\$ -	\$ -	\$ -	\$ 0.900	\$ 0.625	\$ (0.275)
1b	Superfluid helium cryostat upgrade	\$ -	\$ 0.198	\$ 0.198	\$ 1.000	\$ 0.689	\$ (0.311)	\$ 1.000	\$ 0.887	\$ (0.113)
1c	Testing at KEK	\$ -	\$ -	\$ -	\$ 0.350	\$ 0.252	\$ (0.098)	\$ 0.350	\$ 0.252	\$ (0.098)
1d	³ He	\$ 0.300	\$ 0.226	\$ (0.074)	\$ -	\$ -	\$ -	\$ 0.300	\$ 0.226	\$ (0.074)
1e	Final moderator and rad safety	\$ 0.230	\$ -	\$ (0.230)	\$ 0.240	\$ -	\$ (0.240)	\$ 0.470	\$ -	\$ (0.470)
1	UCN Source Upgrade, Other	\$ -	\$ 1.297	\$ 1.297	\$ -	\$ -	\$ -	\$ -	\$ 1.297	\$ 1.297

- “Other” category dominated by:
 - Pumps (\$750k)
 - Fluids (*good news on ³He)
 - Items on the Interface, e.g. gas panels, ...

Rebaselined budget, Jan. 2020.

CFI Budget Without Contingency		Cash \$			In-Kind \$			Total \$		
Item #	Item Description	CFI Sept 2019	Current	Change	CFI Sept 2019	Current	Change	CFI Sept 2019	Current	Change
1	UCN Source Upgrade	\$ 1.430	\$ 2.346	\$ 0.916	\$ 1.590	\$ 0.942	\$ (0.648)	\$ 3.020	\$ 3.287	\$ 0.267
2	UCN transport and detectors	\$ 1.450	\$ 0.950	\$ (0.500)	\$ 0.230	\$ 0.097	\$ (0.133)	\$ 1.680	\$ 1.047	\$ (0.633)
3	Environment and services	\$ 1.100	\$ 0.643	\$ (0.457)	\$ 0.050	\$ 0.008	\$ (0.042)	\$ 1.150	\$ 0.651	\$ (0.499)
4	Data acquisition and controls	\$ 0.550	\$ 0.383	\$ (0.167)	\$ 0.090	\$ 0.007	\$ (0.083)	\$ 0.640	\$ 0.390	\$ (0.250)
5	Magnetic fields	\$ 4.245	\$ 3.708	\$ (0.537)	\$ 1.717	\$ 0.340	\$ (1.377)	\$ 5.962	\$ 4.048	\$ (1.913)
6	Comagnetometer	\$ 1.270	\$ 1.713	\$ 0.443	\$ 0.202	\$ 0.335	\$ 0.133	\$ 1.472	\$ 2.049	\$ 0.577
7	Electric field system and EDM cell	\$ 0.310	\$ 0.406	\$ 0.096	\$ 0.050	\$ 0.076	\$ 0.026	\$ 0.360	\$ 0.482	\$ 0.122
8	Engineering and Technical Support	\$ 1.550	\$ 1.013	\$ (0.537)	\$ -	\$ -	\$ -	\$ 1.550	\$ 1.013	\$ (0.537)
	TOTAL	\$ 11.905	\$ 11.163	\$ (0.742)	\$ 3.929	\$ 1.805	\$ (2.124)	\$ 15.834	\$ 12.968	\$ (2.866)

- EDM Subsystems requested to present “minimal working” budget, to support UCN source cost overruns.
- Retain funds for outlying facilities at UBC and The University of Winnipeg.

Canadian budget only

CFI Budget Without Contingency, Canadian Only										
		Cash \$			In-Kind \$			Total \$		
Item #	Item Description	CFI Sept 2019	Current	Change	CFI Sept 2019	Current	Change	CFI Sept 2019	Current	Change
1	UCN Source Upgrade	\$ 1.430	\$ 2.346	\$ 0.916	\$ 0.240	\$ -	\$ (0.240)	\$ 1.670	\$ 2.346	\$ 0.676
2	UCN transport and detectors	\$ 1.450	\$ 0.950	\$ (0.500)	\$ 0.230	\$ 0.097	\$ (0.133)	\$ 1.680	\$ 1.047	\$ (0.633)
3	Environment and services	\$ 1.100	\$ 0.643	\$ (0.457)	\$ 0.050	\$ 0.008	\$ (0.042)	\$ 1.150	\$ 0.651	\$ (0.499)
4	Data acquisition and controls	\$ 0.550	\$ 0.383	\$ (0.167)	\$ 0.090	\$ 0.007	\$ (0.083)	\$ 0.640	\$ 0.390	\$ (0.250)
5	Magnetic fields	\$ 4.245	\$ 3.708	\$ (0.537)	\$ 0.937	\$ 0.193	\$ (0.744)	\$ 5.182	\$ 3.901	\$ (1.281)
6	Comagnetometer	\$ 1.270	\$ 1.713	\$ 0.443	\$ 0.202	\$ 0.335	\$ 0.133	\$ 1.472	\$ 2.049	\$ 0.577
7	Electric field system and EDM cell	\$ 0.310	\$ 0.406	\$ 0.096	\$ 0.050	\$ 0.076	\$ 0.026	\$ 0.360	\$ 0.482	\$ 0.122
8	Engineering and Technical Support	\$ 1.550	\$ 1.013	\$ (0.537)	\$ -	\$ -	\$ -	\$ 1.550	\$ 1.013	\$ (0.537)
	TOTAL	\$ 11.905	\$ 11.163	\$ (0.742)	\$ 1.799	\$ 0.716	\$ (1.083)	\$ 13.704	\$ 11.879	\$ (1.825)

- Focused on Canadian budget issues, for more accurate representation.

Examples of “restrained” budget

- Examples of “restrained” budget
 - MSR – work with less experienced company, in line after LANL EDM.
 - Cs magnetometers – start with 5 magnetometers, understand scalability of cost with vendor.
 - Guide-coating facility – acquire used parts for laboratory at The University of Winnipeg.
- Need to apply this concept to UCN source as well, striking a balance between UCN source and EDM experiment.
 - Scalability of pumping systems
 - Not yet applied to the rebaselining, but it needs to be.
- Some (but not all) priority given to UCN source and MSR.
 - These will define the landscape of our experiment for many years to come.
- Need to strike a balance (Source vs. MSR vs. other subsystems)

Contingency board

11. Contingency board for Canadian funds

11.1. Role and definition

- The contingency board oversees the budget contingency of the Canadian portion of the CFI project 36322.
- The budget contingency is defined as the difference between the baseline budget as agreed upon by the collaboration and the available Canadian funds in the CFI project 36322.
- The contingency control level will roughly on the sublevel of the CFI line items as defined in the IIA and 2020 EDM CDR.
- Collaborators who project to exceed their funds allocated in the baseline budget request access to the contingency funds.
- Budget overruns below \$1000 or 2 % of the allocated baseline budget do not have to be justified.
- The contingency board decides on this request up to \$50 000.
- Above \$50 000, the EC (or collaboration assembly) has to approve the additional spending by a majority vote.
- To start with, the contingency board equals the EC. The long-term membership will be defined in the next TUCAN collaboration meeting 2020.
- The term of the contingency board members is 2 years renewable.

- Proposed amendment to collaboration agreement.
- Initially overseen by TUCAN Executive Committee (EC) (recent elections... Martin, Hatanaka, Picker, Momose, Kawasaki, Mishima)
- Mostly concerns CFI, provincial, TRIUMF funds.
- Comes into effect at some final stage of rebaselining.

Summary

- Budget is a finite resource.
- Need to reserve additional budget for UCN Source, at expense of other subsystems.
- Staged, scalable, or restrained approach used for subsystems, where possible.
- Contingency board to oversee release of additional funds.