

Major Recommendations: from the Executive Summary of the LRP booklet.

G. G. Fahlman, March 21, 2004

1	Join Alma. This should be Canada's highest priority for participation in a major, new, ground-based observatory.	<ul style="list-style-type: none"> • NAPRA NRC & HIA: AUI & NRAO: Sept 2001. <ul style="list-style-type: none"> ◦ EVLA correlator valued at US\$10M. • MOU on ALMA between NSF-NRC signed June 2003. <ul style="list-style-type: none"> ◦ Secures Canada's access independently of NAPRA. • NRC LRP allocation (2002-06) to HIA for ALMA: \$17,420k. <ul style="list-style-type: none"> ◦ Additional funding needed post FY2006-07. • CFI Award to U. Calgary: \$7,926k. • NRC EVLA funding (2003) to HIA-DRAO: \$20,000k. <ul style="list-style-type: none"> • New issue: funding early science operations (2007-08)
2	Join NGST. This should be Canada's highest priority for a major, space-based observatory.	<ul style="list-style-type: none"> • Done: CSA funded. • HIA has assisted program development with support from CSA.
3	LAR concept be carried forward into prototypes for key component (phase B) studies.	<ul style="list-style-type: none"> • Underway: HIA-DRAO • NRC LRP allocation (2002-04) \$2,430k <ul style="list-style-type: none"> ◦ Current funding ends March 31, 2005 • Plans for continued work under development
4	<p>A team be established to develop designs for VLOT. Canada should join a world team in this effort.</p> <p>Canada should also position itself to be involved with a possible ground-based VLOT that may be 25m in diameter or even more.</p>	<ul style="list-style-type: none"> • NRC LRP allocation (2002-2004): \$4,350k <ul style="list-style-type: none"> ◦ Funding ends in March 31, 2005 • Team was established at HIA-DAO • VLOT Project Book published October 2003 • Interim TMT development with AURA, U. California, Caltech <ul style="list-style-type: none"> • CFI proposal submitted by U. Toronto on behalf of ACURA <ul style="list-style-type: none"> ◦ "Second to none" participation • ACURA LOI to join the TMT DDP • On-going (as of March 2004) funding discussion with CFI
5.	A development envelope should be established that could fund the construction of LAR or VLOT prototypes, if recommended by a rigorous mid-course review...	<ul style="list-style-type: none"> • LAR: see item 3 above. Some prototype components purchased or constructed ; issue now is how far to carry prototype development and whether a LAR-type "pathfinder" for SKA science should be built New funding is required for the stated purpose • VLOT: prototype concept unclear; the TMT DDP will include prototype components as specified in the project plan. • CFI funding is sought for Canada's share of DDP, with NRC-HIA providing new "matching" funds at approximately the level of the present LRP allocation for VLOT development.

6	Canada position itself now for entry into the construction of SKA as well as VLOT.	<ul style="list-style-type: none"> • SKA: positioning is through the LAR prototype, two Canadian members on the International SKA Secretariat (11% of membership). • No discussion yet of ultimate cost to Canada of participating in construction, the start remains uncertain (post 2010). <p>VLOT: ACURA LOI for the TMT DDP includes intent to construct.</p> <ul style="list-style-type: none"> • Current TMT plan calls for construction proposals to be submitted in the Fall of 2006 and for construction to begin in late 2007. • Mechanisms for funding construction and operations at the “second to none” level are unclear. (Estimated construction cost to Canada: \$250M; life cycle costs over 20 years: \$500M)
7	Enhancement of the correlator and receiver groups within NRC.	<ul style="list-style-type: none"> • The NRC LRP allocation of 2002-06 included an allocation for the DAO based receiver group that has been folded into the “ALMA” allocation: • The DRAO based correlator group has been allocated \$1,070k over 5 years.
8	Gemini should be given the highest priority for ongoing operation and support of our international observatories.	<ul style="list-style-type: none"> • The NRC LRP allocation (2002) included contributions to partially offset the growth of the Gemini operational costs. <p>Gemini operations and new development costs are expected to rise sharply in 2006.</p>
9	Participation (40%) in a new wide-field OIR 8m.	This idea was explored as a replacement for CFHT and rejected by the partner agencies. This idea has not been pursued as all efforts for a new OIR telescope are aimed at participation in a VLOT.
10	Through CSA, join and participate in FIRST/PLANCK.	FIRST has become Herschel and there is some participation by Canada in both missions, funded by the CSA.
11	On ongoing presence in space based VLBI be maintained through CSA programs	Canada’s involvement in the VSOP mission is ramping down. It is my understanding that the JCSA has not identified any future missions for Canadian participation.
12	<p>At least six additional staff astronomers be hired for HIA, in addition to new technical staff.</p> <p>The HIA should also play an increased role in front-rank research and scientific leadership.</p>	<ul style="list-style-type: none"> • The 2002 NRC LRP allocation was divided to explicitly include a provision for the salaries of new scientific staff. • Under Simon Lilly’s leadership, HIA recruited two astronomers for the HIA Millimeter Astronomy Group. • The CADC has recruited two additional astronomers. • Recently, two more astronomers were recruited under the NRC New Horizons program and they will start in 2004. • Note: The LRP salary money is “soft”. Continuing salary support and operational support for research activities must come from “A-base” funds, which have been effectively frozen for many years., or from other new program funding.

13	<p>High profile, international PDFs of the stature of the NASA Hubble Fellows be established.</p> <p>CSA-NSERC: at least six 3 year PDFs tenable at any Canadian University or CITA.</p> <p>NRC: Herzberg Fellow Program: six 3 year PDFs tenable at any NRC astronomy facility or laboratory.</p>	<p>NRC-HIA has not initiated a Fellowship Program as described in the LRP because of higher priority use of funds.</p> <p>Note: NRC has a Herzberg Prize and Fellowship award open across the Council – the 2002 winner was Puragra Guhathakurta.</p>
14	<p>University Laboratories for experimental astrophysics be created.</p>	<ul style="list-style-type: none"> • HIA is associated with a new laboratory, oriented toward astronomical instrumentation and adaptive optics, based at the University of Victoria. It was funded initially from CFI and has recently received an NSERC grant. • The commitment must come from the university community.
15	<p>CADC: develop innovative data mining techniques that maximize the scientific usefulness of multi-wavelength observations in astronomy.</p>	<ul style="list-style-type: none"> • The NRC award in 2002 included a an allocation to the CADC for five years totaling \$1,560k, which is being used for staff support. • This data mining initiative is proceeding as the Canadian Virtual Observatory (CVO) project, and is linked to similar programs elsewhere, including the IVO concept.
16	<p>Support and upgrade of a joint NRC/CITA mid-range parallel computer plus a local support person. This facility should be located at CITA to provide national high performance computing for modeling and simulations.</p>	<ul style="list-style-type: none"> • A system has been established at CITA that fulfills the functionality in the LRP recommendation. • No allocation for HPC was made from the NRC LRP funds awarded to HIA.
17	<p>Approximately 1.5% of any project budget be allocated towards the support of related outreach initiatives. Furthermore, the NRC and the CSA should create modern visitor centers..</p>	<p>There is no specific allocation from the LRP awards to NRC-HIA toward outreach activities.</p> <p>HIA has established the “Center of the Universe”, a modern, purpose built visitor center on the DAO site in Victoria. The Center does generate revenue but HIA is subsidizing the operations of this at a level which currently exceeds the 1.5% called for in the LRP (although the CU programs are not specifically targeted at the LRP projects).</p>
18	<p>CASCA and NRC, with the participation of CSA should create a a first rank national web site for astronomy.</p>	<p>Status of this recommendation is unclear. HIA has no specific budget item for this activity. Note that HIA (in common with all of NRC) has expended considerable time and some resources to make the HIA web pages as compatible with the “Common Look and Feel” policy of the Government of Canada.</p>
19	<p>CASCA play a steering role in the area of educational outreach to schools. It should ... [maintain] a related web site,....</p>	<p>The CASCA education website has been established.</p>