

APPENDIX A: Interdependence of development issues

performance to be improved	development item	degree of improvement	speed/technical difficulty	cost	beneficial for
sensitivity	more antenna	add 5 antenna 10%	quick	expensive	all science
	new digital system/2GC	10%	moderate	expensive	all science
	receiver development (lower noise)	10 – 20%?	moderate?	moderate?	all science
angular resolution	longer baseline	a factor of a few	easy/quick but phase stability issues (including atmospheric and LO reference) should be improved as well	expensive?	limited brightest sources
	VLBI	orders of magnitude	easy/quick?	cheap	Sgr A* and very limited bright and compact sources
field of view	multi-beam receiver	a factor of a few?	long/tough? Enhance correlator power is also required?	expensive?	almost all science (but for compact sources)
	under-illuminated feed	a factor of a few	moderate?	moderate	Solar obs only
spectral coverage	band 1		medium-term	moderate	SZ, redshifted lines, protoplanetary disks, solar
	band 2		medium-term	moderate	SZ, redshifted lines, protoplanetary disks, solar
	band 5		medium-term	moderate	redshifted lines, planetary atmosphere
	band 11		long-term	moderate?	redshifted atomic lines, galaxies?
simultaneous frequency coverage	multi-frequency feed	a factor of a few	moderate? Enhance correlator power is also required (for narrow band observations BLC can accommodate?)	moderate?	almost all science?
	receiver development (wider frequency coverage)	a factor of a few?	moderate? Enhance correlator power is also required to cover whole wide freq. range?	moderate?	ISM, galaxies?
	new digital system/2GC	an order of magnitude? (at high spectral resolution mode)	moderate	expensive	ISM, galaxies?
imaging quality	more antenna	add 5 antennas \Rightarrow \sim 13% gain?	quick	expensive	targets with extended structures
	more 7m antenna	?	moderate?	expensive?	targets with extended structures
	software development	??	all	moderate?	all science
accuracy of amplitude	improved calibration device	???	difficult?	??	ISM?
accuracy of phase	improved atmospheric correction	???	difficult?	??	almost all science which requires high angular resolution
accuracy of polarization	improved calibration device	???	difficult?	??	star formation, ISM