

R&D Plan: Priorities and Task Assignments

Project priorities: [1] = highest priority (essential), [2] = baseline (necessary), [3] = other (non-essential).

1 Antenna Research and Development (Rick/Peter)

1.1 Focal Plane Arrays (Rick) [1]

1.2 Reflector Accuracy/Metrology (Rick) [2]

1.2.1 Dense Metrology Sensor Infrastructure for Radio Telescope Applications: (Rick) [2]

1.2.2 Position and Displacement Sensors for the GBT: (Rick) [2]

1.3 Ultra-Wideband Feeds (Rick) [2]

1.4 Physical Optics (Peter) [1]

2 Receiver Technology

2.1 Amplifiers (John W) [2]

2.1.1 Introduction:

2.1.2 MMIC Technology: (John W) [2]

2.1.3 HFET noise theory, modeling, and repeatability at cryogenic temperatures: (John W) [2]

2.1.4 1/f noise in HFETs and its influence on radiometer properties: (John W) [2]

2.1.5 Heterostructure Bipolar Transistors noise theory and limitations: (John W) [3]

2.1.6 InP HBT small and medium scale ICs in radio astronomy instrumentation: (John W) [2]

2.2 SIS Mixers (Tony)

2.2.1 Introduction:

2.2.2 Technology Development for 780-950 GHz Heterodyne Receivers: (Tony) [1]

2.2.3 New materials for SIS mixers: (Tony) [3]

2.3 Specific Receiver Systems (Tony)

2.3.1 Continuum Radiometer Development: (Tony) [3]

2.3.2 Development of a 1.4 THz Receiver: (Tony) [3]

2.4 Local Oscillator and Signal Sources (John W)

2.4.1 Highly Integrated Multiplier Chains: (John W) [2]

2.4.2 Photonic Local Oscillators, Test and Calibration Sources: (John Payne) [2]

2.5 Cryogenics (Rick)

2.5.1 New Cryogenic Technology: (Rick) [2]

2.5.2 Cryocoolers: (Rick ??) [2]

2.6 Other Receiver and Measurement Technology

2.6.1 Wideband Components: (Rick) [2]

2.6.2 Integration of Wideband Feeds with Amplifiers: (Rick) [2]

3 Signal Processing and Transmission

3.1 Digital Signal Transmission: (Rick) [2]

3.2 Satellite Based LO Reference Distribution: (Peter) [2]

3.3 Wide Bandwidth Digitization: (Larry) [1]

3.4 RFI Mitigation Techniques: (Rick) [2]

3.4.1 General: (Rick) [2]

3.4.2 Digital Filtering: (Rick) [2]

3.4.3 Spatial Nulling: (Rick) [2]

3.4.4 Blanking and Adaptive Cancellation: (Rick) [2]

3.4.5 Signal Propagation: (Rick) [2]

3.5 Advanced Digital Correlators: (John W) [1]

3.6 Water Vapor Radiometers: (Peter) [3]