WHAT IS CLAIMED IS:

1. A receiver system, comprising:

at least one antenna for receiving a plurality of signals, including a desired signal, across a wide band of frequencies;

at least one tunable filter in signal communication with the at least one antenna for filtering the plurality of signals to produce a plurality of filtered signals;

gain control circuitry in signal communication with the at least one tunable filter for producing a gain adjusted version of the filtered signals at an output of the gain control circuitry;

an analog-to-digital converter in signal communication with the output of the gain control circuitry and configured to digitize the gain adjusted version of the filtered signals without down-conversion of the plurality of signals to an intermediate frequency; and

a processing unit configured to process received signals in a portion of the wide band to extract signal characteristics of at least one undesired signal in the portion of the wide band,

wherein the at least one tunable filter is interposed between the at least one antenna and the gain control circuitry and is tuned based at least in part on the signal characteristics of the at least one undesired signal, extracted by the processing unit, so as to attenuate the at least one undesired signal sufficient to prevent the gain control circuitry from adjusting the gain of the desired signal below a threshold level, thereby maintaining a signal-to-noise ratio of the desired signal above a threshold level at output of the gain control circuitry.

2. The receiver system of claim 1, wherein the at least one antenna, the at least one tunable filter, and the gain control circuitry form part of a primary receiver, and wherein the processing unit forms part of an auxiliary receiver that is separate from the primary receiver.

3. The receiver system of claim 2, wherein the auxiliary receiver includes: at least one antenna for receiving signals in the wide band, and wherein the processing unit includes: an analog-to-digital converter in signal communication with the at least one antenna of the auxiliary receiver for converting the signals received by the at least one antenna of the auxiliary receiver to a plurality of digital signals, and a digital processing system in signal communication with the analog-to-digital converter for evaluating power and frequency values of the plurality of digital signals.

4. The receiver system of claim 2, wherein the primary receiver includes a processing unit that includes: an analog-to-digital converter in signal communication with the gain control circuitry for converting the gain adjusted version of the filtered signals into a plurality of digital signals, and a digital processing system in signal communication with the analog-to-digital converter of the primary receiver for demodulating and decoding the plurality of digital signals so as to recover the desired signal.

5. The receiver system of claim 2, wherein the primary receiver includes a processing unit configured to: receive, from the processing unit of the auxiliary receiver, the signal characteristics of the at least one undesired signal extracted by the processing unit of the auxiliary receiver, and tune the at least one tunable filter based on the signal characteristics received from the processing unit of the auxiliary

receiver.

6. The receiver system of claim 1, wherein the desired signal includes message symbols transmitted during a signaling interval, and wherein the at least one tunable filter is tuned during the signaling interval.

7. The receiver system of claim 6, wherein the gain control circuitry produces a gain adjusted version of the filtered signals during the signaling interval.

8. The receiver system of claim 1, wherein the processing unit includes:

an analog-to-digital converter in signal communication with the gain control circuitry for converting the gain adjusted version of the filtered signals into a plurality of digital signals, and

a digital processing system in signal communication with the analog-to-digital converter for demodulating and decoding the plurality of digital signals so as to recover the desired signal.

9. The receiver system of claim 1, wherein the at least one tunable filter includes at least one notch filter.

10. The receiver system of claim 9, wherein the at least one notch filter is tuned by adjusting one or more tuning parameters including one or more of: center frequency, rejection bandwidth, rejection bandwidth shoulder, and attenuation depth.

11. The receiver system of claim 1, wherein the at least one tunable filter includes at least one band-pass filter.

12. The receiver system of claim 1, further comprising: a band-pass filter in signal communication with the at least one antenna configured to select a band of signals from the at least one antenna.

13. The receiver system of claim 12, further comprising: a low-noise amplifier in signal communication with the band-pass filter for producing an amplified version of the signals in the selected band.

14. The receiver system of claim 1, wherein the signal characteristics of the at least one undesired signal includes at least one of power or frequency values of the at least one undesired signal.

15. The receiver system of claim 1, wherein the at least one tunable filter is tuned so as to attenuate the at least one undesired signal sufficient to prevent adjusting the gain of the desired signal below a threshold level.

16. The receiver system of claim 1, wherein the desired signal is in the portion of the wide band of frequencies.

17. The receiver system of claim 1, wherein the wide band covers a bandwidth of at least 100 MHz.

18. The receiver system of claim 1, wherein the wide band covers a bandwidth of at least 400 MHz.

19. A receiver system, comprising:

a first receiver comprising:

at least one antenna for receiving a plurality of signals, including a desired signal, across a wide band of frequencies,

an interference mitigation unit in signal communication with the at least one antenna including at least one tunable filter,

gain control circuitry in signal communication with the interference mitigation unit,

an analog-to-digital converter in signal communication with an output of the gain control circuitry and configured to digitize a gain adjusted version of signals from the gain control circuitry without down-conversion of the plurality of signals to an intermediate frequency, and

a processing unit in signal communication with the interference mitigation unit configured to demodulate and decode signals; and

a second receiver that is separate from the first receiver, comprising:

at least one antenna for receiving a plurality of signals across a portion of the wide band, and

a processing unit in signal communication with the at least one antenna of the second receiver and configured to:

process the plurality of signals in the portion of the wide band to identify at least one undesired signal in the portion of the wide band and extract signal characteristics of the at least one undesired signal, and provide the extracted signal characteristics to the processing unit of the first receiver,

wherein the at least one tunable filter is interposed between the at least one antenna of the first receiver and the gain control circuitry and is tuned by the processing unit of the first receiver based at least in part on the signal characteristics of the at least one undesired signal, extracted by the processing unit of the second receiver, so as to attenuate the at least one undesired signal sufficient to prevent the gain control circuitry from adjusting the gain of the desired signal below a threshold level, thereby maintaining a signal-to-noise ratio of the desired signal above a threshold level at output of the gain control circuitry.

20. The receiver system of claim 19, wherein the at least one tunable filter includes at least one notch filter.

21. The receiver system of claim 20, wherein the at least one notch filter is tuned by adjusting one or more tuning parameters including one or more of: center frequency, rejection bandwidth, rejection bandwidth shoulder, and attenuation depth.

22. The receiver system of claim 19, wherein the at least one tunable filter includes at least one band-pass filter.

23. The receiver system of claim 19, wherein the at least one tunable filter is tuned so as to attenuate the at least one undesired signal sufficient to prevent adjusting the gain of the desired signal below a threshold level.

24. The receiver system of claim 19, wherein the first receiver further

comprises: a band-pass filter in signal communication with the at least one antenna of the first receiver and the interference mitigation unit, the band-pass filter configured to select a band of signals from the at least one antenna of the first receiver.

25. The receiver system of claim 24, wherein the first receiver further comprises: a low-noise amplifier in signal communication with the band-pass filter and the interference mitigation unit.

26. The receiver system of claim 19, wherein the processing unit of the first receiver is further configured to: receive, from the processing unit of the second receiver, the signal characteristics of the at least one undesired signal extracted by the processing unit of the second receiver, and control the interference mitigation unit to tune the at least one tunable filter based on the signal characteristics received from the processing unit of the second receiver in order to filter the plurality of signals.

27. The receiver system of claim 26, wherein the processing unit of the first receiver includes: an analog-to-digital converter in signal communication with the interference mitigation unit for converting the plurality of filtered signals to a plurality of filtered digital signals, and a digital processing system in signal communication with the analog-to-digital converter for demodulating and decoding the desired signal from the plurality of filtered digital signals.

28. The receiver system of claim 19, wherein the processing unit of the second receiver includes: an analog-to-digital converter in signal communication with the at least one antenna of the second receiver for converting the signals received by the at least one antenna of the second receiver to a plurality of digital signals, and a digital

processing system in signal communication with the analog-to-digital converter for evaluating power and frequency values of the plurality of digital signals.

29. A receiver system, comprising:

a first receiver comprising:

at least one antenna for receiving a plurality of signals, including a desired signal, across a wide band of frequencies,

an interference mitigation unit in signal communication with the at least one antenna including at least one tunable filter,

gain control circuitry in signal communication with the interference mitigation unit,

an analog-to-digital converter in signal communication with an output of the gain control circuitry and configured to digitize a gain adjusted version of signals from the gain control circuitry without down-conversion of the plurality of signals to an intermediate frequency, and

a processing unit associated with the interference mitigation unit and a second receiver that receives a plurality of signals across at least a portion of the wide band, identifies at least one undesired signal in the plurality of signals across the at least the portion of the wide band, and extracts signal information associated with the at least one undesired signal, the processing unit configured to:

receive, from the second receiver, the signal information, extracted by the second receiver, associated with the at least one undesired signal, and

tune the at least one tunable filter based at least in part on the signal information, extracted by the second receiver, associated with the at least one undesired signal so as to attenuate the at least one undesired signal sufficient to prevent the gain control circuitry from adjusting the gain of the desired signal below a threshold level, thereby maintaining a signal-to-noise ratio of the desired signal above a threshold level at output of the gain control circuitry.

30. The receiver system of claim 29, further comprising: an auxiliary receiver corresponding to the second receiver comprising: at least one antenna for receiving the plurality of signals, and a processing unit configured to: process the plurality of signals so as to identify the at least one undesired signal and extract the signal information associated with the at least one undesired signal, and provide the signal information to the processing unit of the first receiver.

31. The receiver system of claim 29, wherein the at least one tunable filter includes at least one notch filter.

32. The receiver system of claim 31, wherein the at least one notch filter is tuned by adjusting one or more tuning parameters including one or more of: center frequency, rejection bandwidth, rejection bandwidth shoulder, and attenuation depth.

33. The receiver system of claim 29, wherein the at least one tunable filter includes at least one band-pass filter.

34. The receiver system of claim 29, wherein the at least one tunable filter is tuned so as to attenuate the at least one undesired signal sufficient to prevent adjusting the gain of the desired signal below a threshold level.

35. A receiver system, comprising:

an auxiliary receiver comprising:

at least one antenna for receiving a first plurality of signals across a portion of a wide band of frequencies, and

a processing unit in signal communication with the at least one antenna and configured to process the first plurality of signals so as to: identify at least one undesired signal in the portion of the wide band, and extract signal information associated with the at least one undesired signal; and

a primary receiver comprising:

at least one antenna for receiving a second plurality of signals, including a desired signal, across the wide band of frequencies,

at least one tunable filter in signal communication with the at least one antenna of the primary receiver for filtering the second plurality of signals to produce a plurality of filtered signals,

gain control circuitry in signal communication with the at least one tunable filter for producing a gain adjusted version of the filtered signals, and

a processing unit in signal communication with the gain control circuitry configured to:

digitize the gain adjusted version of the filtered signals without down-conversion of the second plurality of

signals to an intermediate frequency, and

demodulate and decode the digitized signals so as to recover the desired signal,

wherein the at least one tunable filter is tuned based at least in part on the signal information associated with the at least one undesired signal extracted by the processing unit of the auxiliary receiver so as to attenuate the at least one undesired signal sufficient to prevent the gain control circuitry from adjusting the gain of the desired signal below a threshold level, thereby maintaining a signal-to-noise ratio of the desired signal above a threshold level at input to the processing unit of the primary receiver.

36. The receiver system of claim 35, wherein the at least one tunable filter includes at least one notch filter.

37. The receiver system of claim 36, wherein the at least one notch filter is tuned by adjusting one or more tuning parameters including one or more of: center frequency, rejection bandwidth, rejection bandwidth shoulder, and attenuation depth.

38. The receiver system of claim 35, wherein the at least one tunable filter includes at least one band-pass filter.

39. The receiver system of claim 35, wherein the at least one tunable filter is tuned so as to attenuate the at least one undesired signal sufficient to prevent adjusting the gain of the desired signal below a threshold level.

40. A method for receiving signals, the method comprising:

receiving, at one or more antenna, a plurality of signals, including a desired signal, across a wide band of frequencies;

processing received signals in a portion of the wide band to: identify at least one undesired signal in the portion of the wide band, and extract signal characteristics associated with the at least one undesired signal;

tuning at least one tunable filter based at least in part on the extracted signal characteristics of the at least one undesired signal;

passing the plurality of signals through the at least one tunable filter to produce a plurality of filtered signals;

passing the plurality of filtered signals through gain control circuitry to produce a gain adjusted version of the filtered signals; and

digitizing the gain adjusted version of the filtered signals

without down-converting the plurality of signals to an intermediate frequency,

wherein the at least one tunable filter

is tuned based at least in part on the extracted signal characteristics of the at least one undesired signal so as to

attenuate the at least one undesired signal sufficient to prevent the gain control circuitry from adjusting the gain of the desired signal below a threshold level, thereby maintaining a signal-to-noise ratio of the desired signal above a threshold level at output of the gain control circuitry.

41. The method of claim 40, wherein the processing the received signals includes: digitizing the received signals to produce a plurality of digitized signals, and

analyzing the digitized signals to identify at least one of power or frequency values of the at least one undesired signal.

42. The method of claim 41, wherein the analyzing the digitized signals includes applying a Fast Fourier Transform to the digitized signals.

43. The method of claim 40, further comprising:

digitizing the gain adjusted version of the filtered signals to produce a plurality of digitized signals; and

demodulating and decoding the digitized signals to recover the desired signal.

44. The method of claim 40, wherein the desired signal includes message symbols transmitted during a signaling interval, and the method further comprising:

continually monitoring, during the signaling interval, for new undesired signals in one or more portions of the wide band by processing signals in the one or more portions of the wide band; and

tuning the at least one tunable filter based at least in part on signal characteristics associated with the identified new undesired signals.

45. A wideband multi-channel receiver system, comprising:

an antenna unit comprising one or more antennas for receiving a plurality of signals across a wide band of frequencies;

a plurality of band-pass filters in signal communication with the antenna unit, each of the band -pass filters configured to receive signals from some of the one or more antennas, the band-pass filters having different respective passbands and each band-pass filter configured to filter the

signals from the some of the one or more antennas to produce a set of first filtered signals in the passband of the band-pass filter;

an interference mitigation unit including at least one set of one or more tunable filters in signal communication with the band-pass filters configured to filter each set of the first filtered signals received from the band-pass filters to produce a corresponding set of second filtered signals;

a plurality of gain control units in signal communication with the interference mitigation unit, each gain control unit configured to produce a gain adjusted version of signals for each set of second filtered signals;

a plurality of analog-to-digital converters, each configured to digitize the gain adjusted version of signals from a corresponding one of the gain control units without down-conversion of the plurality of signals to an intermediate frequency; and

a processing unit configured to process the plurality of signals across the wide band of frequencies so as to: identify at least one undesired signal in the pass-band of one of the band-pass filters, and extract signal information associated with the at least one undesired signal,

wherein at least one of the tunable filters is tuned based at least in part on the signal information, extracted by the processing unit, associated with the at least one undesired signal so as to attenuate the at least one undesired signal sufficient to prevent the corresponding one of the gain control units from adjusting the gain of the desired signal below a threshold level, thereby maintaining a signal-to-noise ratio of a desired signal in the pass-band of the one of the band-pass filters above a threshold level at an output of a corresponding one

of the gain control units.

46. The wideband multi-channel receiver system of claim 45, wherein for each set of one or more tunable filters, the one or more tunable filters includes at least one notch filter.

47. The wideband multi-channel receiver system of claim 46, wherein the at least one notch filter is tuned by adjusting one or more tuning parameters including one or more of: center frequency, rejection bandwidth, rejection bandwidth shoulder, and attenuation depth.

48. The wideband multi-channel receiver system of claim 45, wherein for each set of one or more tunable filters, the one or more tunable filters includes at least one band-pass filter.

49. A receiver system, comprising:

at least one antenna for receiving a plurality of signals, including a desired signal, across a wide band of frequencies;

at least one tunable filter in signal communication with the at least one antenna for filtering the plurality of signals to produce a plurality of filtered signals and for providing the plurality of filtered signals to gain control circuitry that produces a gain adjusted version of the filtered signals;

a digital processing system configured to process received signals in a portion of the wide band to: identify at least one undesired signal in the portion of the wide band, and extract signal information associated with the at

least one undesired signal; and

an analog-to-digital converter for receiving the gain adjusted version of the filtered signals from the gain control circuitry and for converting the gain adjusted version of the filtered signals into a plurality of digital signals without down-conversion of the plurality of signals to an intermediate frequency,

wherein the at least one tunable filter is tuned based at least in part on the signal information, extracted by the digital processing system, associated with the at least one undesired signal, so as to attenuate the at least one undesired signal sufficient to prevent the gain control circuitry from adjusting the gain of the desired signal below a threshold level, thereby maintaining a signal-to-noise ratio of the desired signal above a threshold level at an input to the analog-to-digital converter.

50. A method for receiving signals, the method comprising:

receiving signals, at one or more antenna, across a wide band of frequencies during a frame time associated with a communication frame of a desired signal;

continually monitoring the received signals by processing the received signals that are received during a message sub-frame time of the communication frame to: i) identify one or more undesired signal in the wide band of frequencies that occur during the message sub-frame time, and ii) extract signal characteristics of the one or more undesired signal;

tuning at least one tunable filter based at least in part on the extracted signal

characteristics of the one or more undesired signal and filtering the received signals by passing the received signals through the at least one tunable filter to produce filtered signals;

passing the filtered signals through gain control circuitry to produce a gain adjusted version of the filtered signals; and

digitizing the gain adjusted version of the filtered signals without down-converting the received signals to an intermediate frequency,

wherein the at least one tunable filter is tuned based at least in part on the extracted signal characteristics of the one or more undesired signal so as to attenuate the one or more undesired signal sufficient to prevent the gain control circuitry from adjusting the gain of the desired signal below a threshold level, thereby maintaining a signal-to-noise ratio of the desired signal above a threshold level at output of the gain control circuitry.