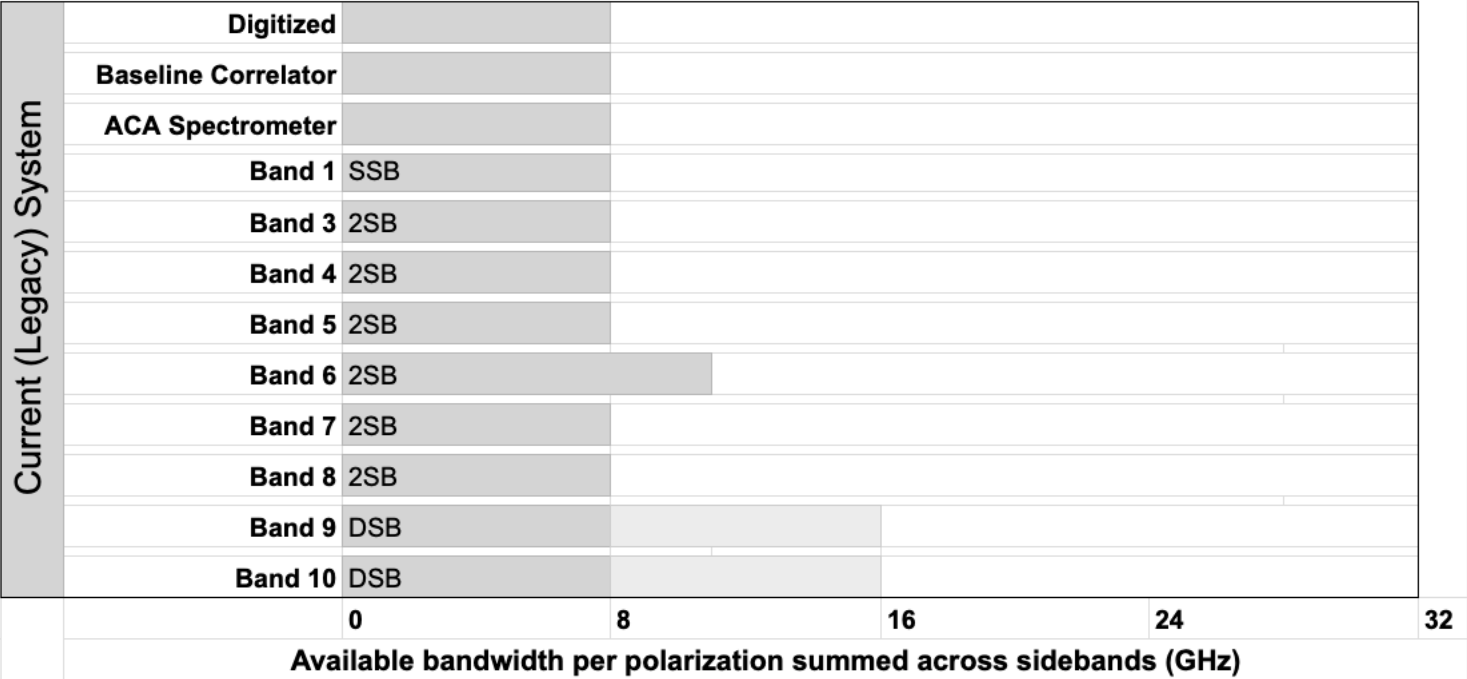
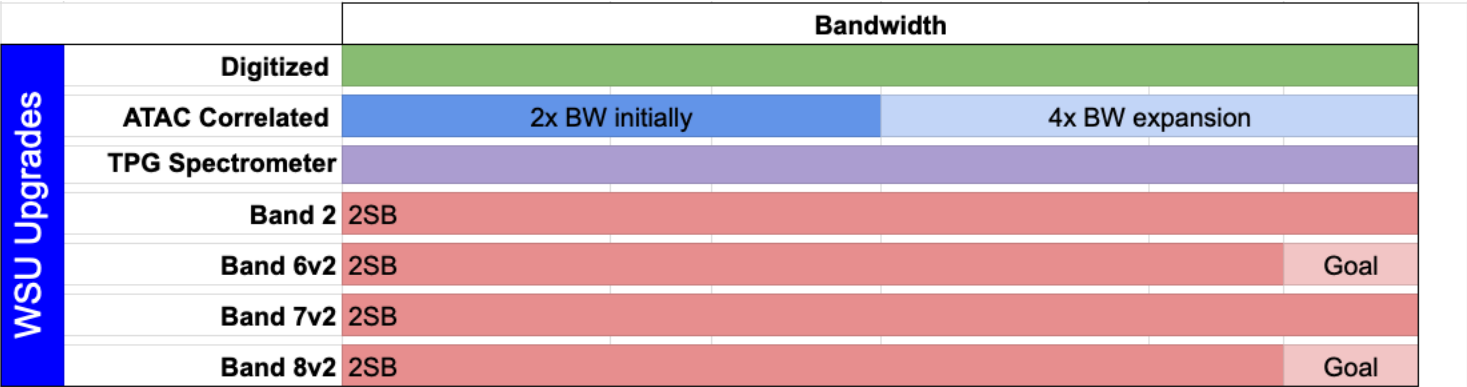


# ALMA Wideband Sensitivity Upgrade (WSU): Overview

Major overhaul of ALMA's hardware, software and some infrastructure delivering:

- New and upgraded receivers
  - ✓ new Band 2 (available in Cycle 13, TBC)
  - ✓ upgraded Bands 6v2, 7v2, and 8v2 (more later)
  - ✓ up to 4x increase (32 GHz/pol) in IF bandwidth
- New digitizers, correlator, and spectrometer
  - ✓ available bandwidth increased to 16 GHz/pol initially and 32 GHz/pol eventually
  - ✓ 10-100x increase in correlated bandwidth at high spectral resolution (0.1 km/s)
- Improved sensitivity
  - ✓ higher digital efficiency (~20%)
  - ✓ lower receiver noise
  - ✓ Increased bandwidth (continuum)
- Improved data processing speed and imaging products

ALMA WSU will benefit all observations, dramatically increasing observing speed and spectral grasp, especially for high-spectral resolution spectral surveys.



**Notes:**

1. Legacy bands will be usable in the WSU System with their current IF bandwidth; DSB receivers are processed using 90 degree Walsh switching to recover the image sideband in the Legacy System.

2. The maximum usable bandwidth in the Legacy System is 7.5 GHz, and is only available at relatively coarse minimum channel width 488.28 kHz (with a spectral resolution 2x poorer due to the need for Hanning Smoothing online).

3. The full ATAC and TPGS bandwidth is usable for channels as fine as 13.5 kHz, a factor of 72 better in spectral resolution.