Summary of APC Working Group

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Objective

• Provide recommendations to the project for APC coefficients and other antenna calibration parameters (e.g. galactic, solar, lunar contributions)

• Evaluate and assess errors in measured and modeled patterns provided pre- and post-launch
Background

• Pre-launch, two patterns were generated
  – Model pattern using GRASP EM modeling software
    • Model only included feed horns and reflectors
    • Spacecraft structures not included
  – Measured pattern using ~1/10 scale model of Aquarius and spacecraft
    • Represented all scattering structures
    • Measured on near field range

• Scale model pattern used to generate pre-launch APC coefficients and correction maps
Issues

• Post-launch, comparison to model showed APC coefficients had too much cross-pol coupling
  – Coefficients empirically adjusted and cross-pol set to zero

• A reassessment of pre-launch patterns identified several issues in the scale model patterns
  – Feed pointing was not equivalent to flight unit
  – Cross-pol coupling “tuned” on the range and prone to error
  – Only measured in one orientation – errors from support structure and missing cones
Current Status

• In collaboration with the SMAP antenna team, new model patterns were generated using a higher fidelity model developed for SMAP
  – Model includes entire spacecraft structure
• New APC terms and correction maps generated from the 2012 model patterns
  – APC parameters required less empirical adjustment to remove residuals from TA model
• WG recommended that the project use the new patterns
• Potential issue: New patterns have a higher spill-over fraction compared to previous patterns
  – Increases warm end TBs – no impact over ocean after re-calibration
  – Analysis on-going to assess radiometer warm end absolute calibration
  – Special cold sky backlobe calibration maneuver conducted