Performance of 1090 Extended Squitter in Future High Density Airspace

(LA 2020)

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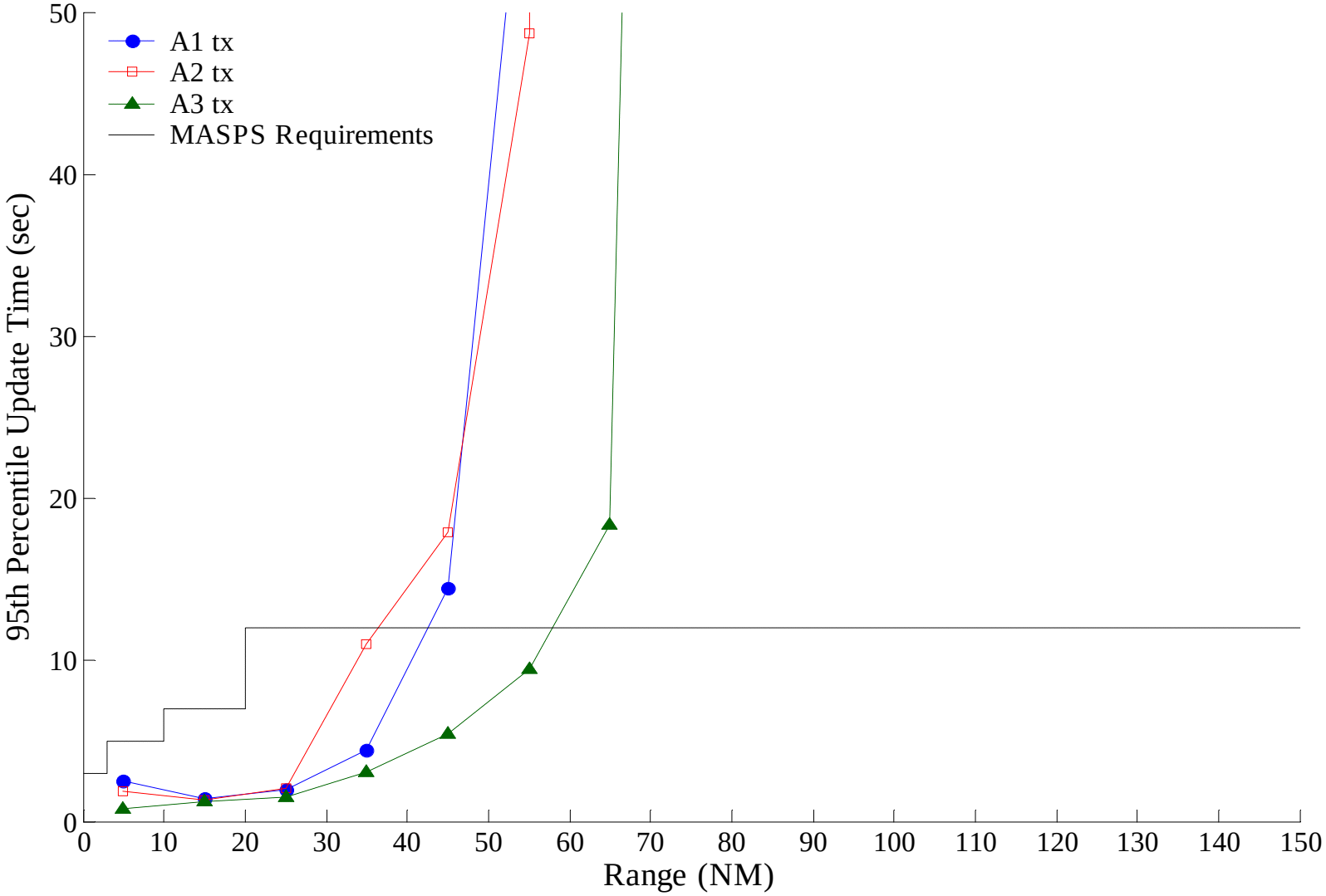
Common Assumptions for All Scenarios

- Single position or velocity reception assumed to result in state vector update
- Transmit Characteristics
  - Transmitter power at antenna
    - A3: 53-56 dBm
    - A1/A2: 51-54 dBm
    - A0: 48.5-51.5 dBm
  - A0 transmit on top only
- Receive characteristics
  - “Mapped” enhanced decoder receiver performance model
  - MTL at antenna: = -84 dBm
  - Receiver diversity (two receivers)
  - Receiver blanked during co-site transmissions (ADS-B, ATCRBS, TCAS, DME)

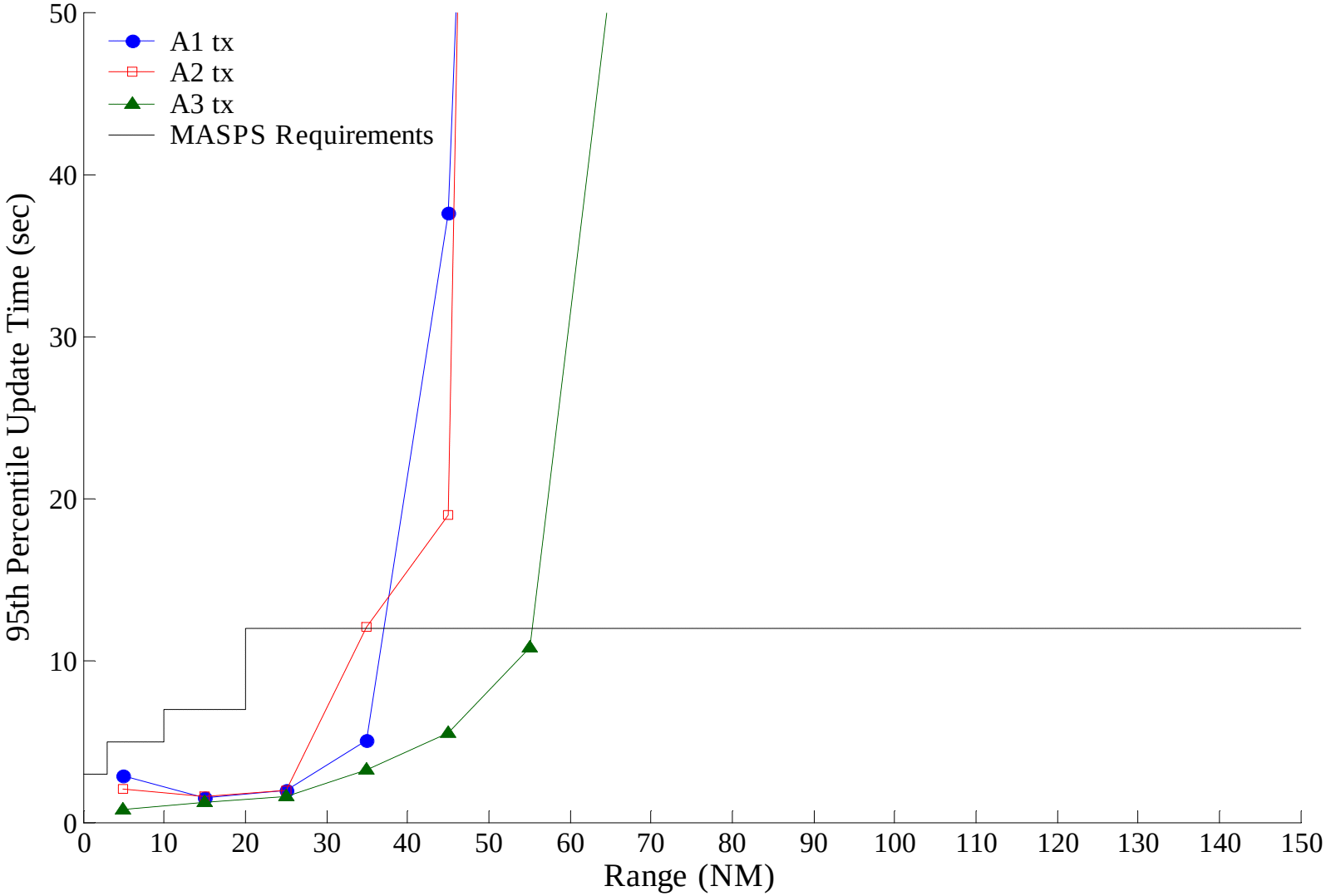
LAX 2020 Assumptions

- Ground vehicles added
  - LA 2020 scenario: 50 vehicles spread among airports
  - Transmit power: 47 dBm
  - 2.2 ES/sec
- Aircraft on ground only transmit from top antenna
- All A0 are assumed to be ATCRBS
- Fruit levels > -84 dBm:
  - 24K ATCRBS, 2.5K Mode S
  - 30K ATCRBS, 3.6K Mode S
- Location directly over LAX at FL400
- Receiver performance model
  - “Mapped” to reproduce FAATC simulation results for 10 MHz sampling rate at –84 dBm sensitivity
  - Dead time removed

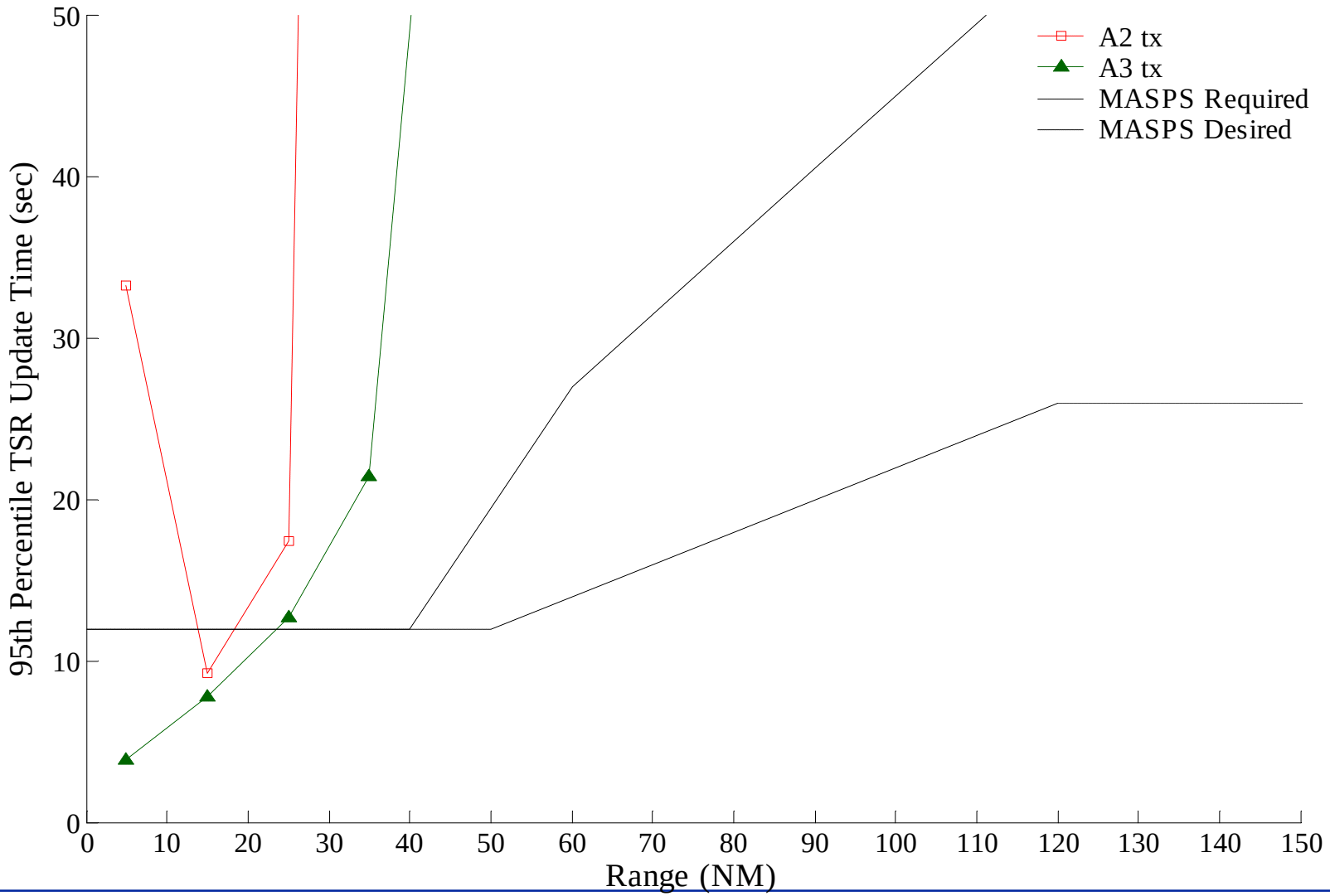
LAX 2020 24k Fruit - State Vector 95th Percentile Update Times



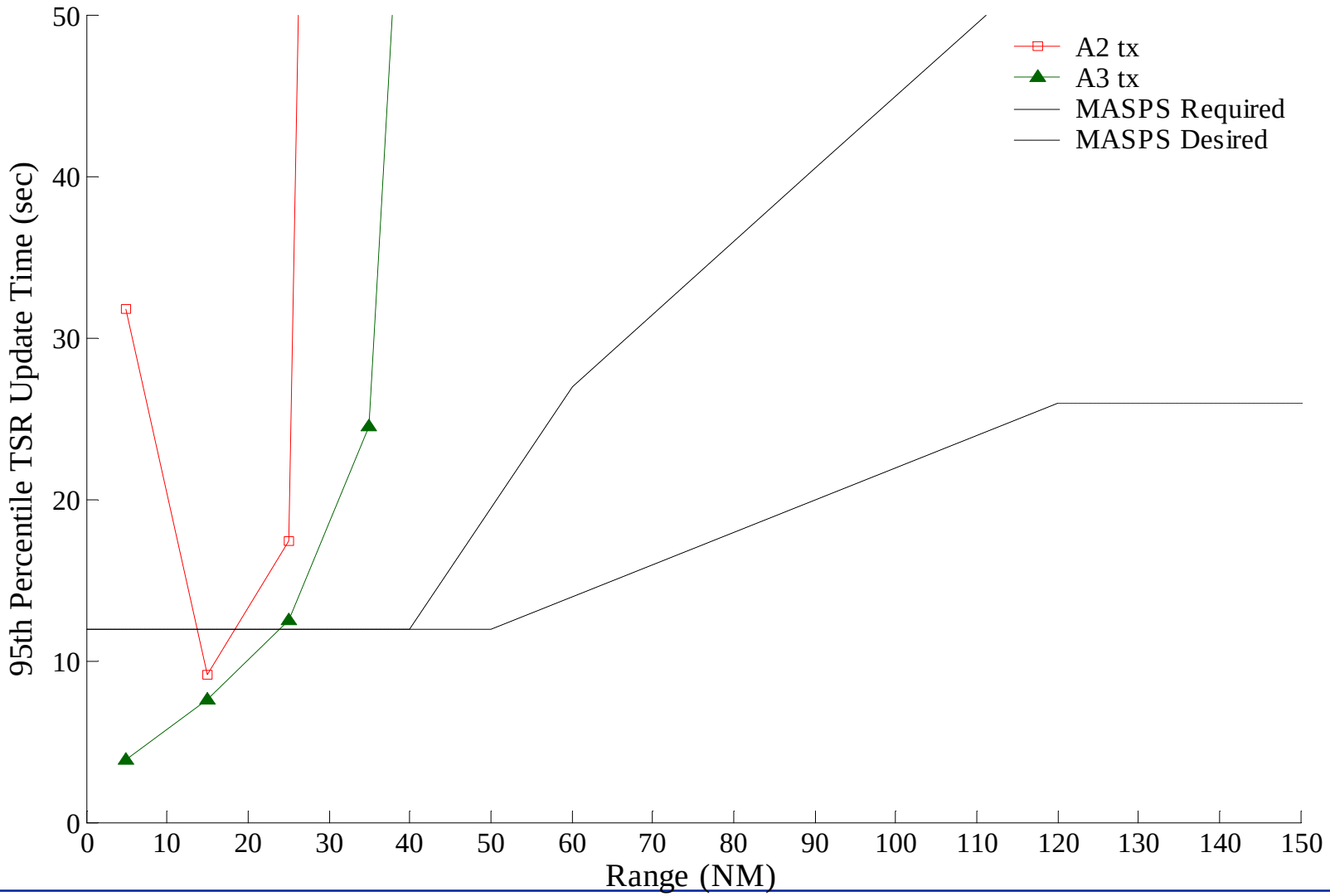
LAX 2020 30k Fruit - State Vector 95th Percentile Update Times



LAX 2020 24k Fruit – TSR 95th Percentile Update Times



LAX 2020 30k Fruit – TSR 95th Percentile Update Times



LAX 2020 Remaining Work

- Produce similar plots for other receivers
  - A2: MTL = -79 dB, 8 MHz sampling rate, enhanced decoder
  - A1: MTL = -79 dB, center-sample (?)
- Air-ground (?)