

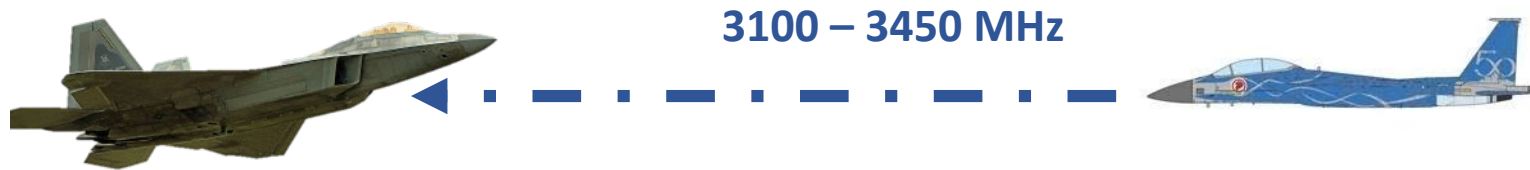


DSA Experiment – Hill AFB

Industry Day – 19 February 2020



Dynamic Spectrum Access Experiment



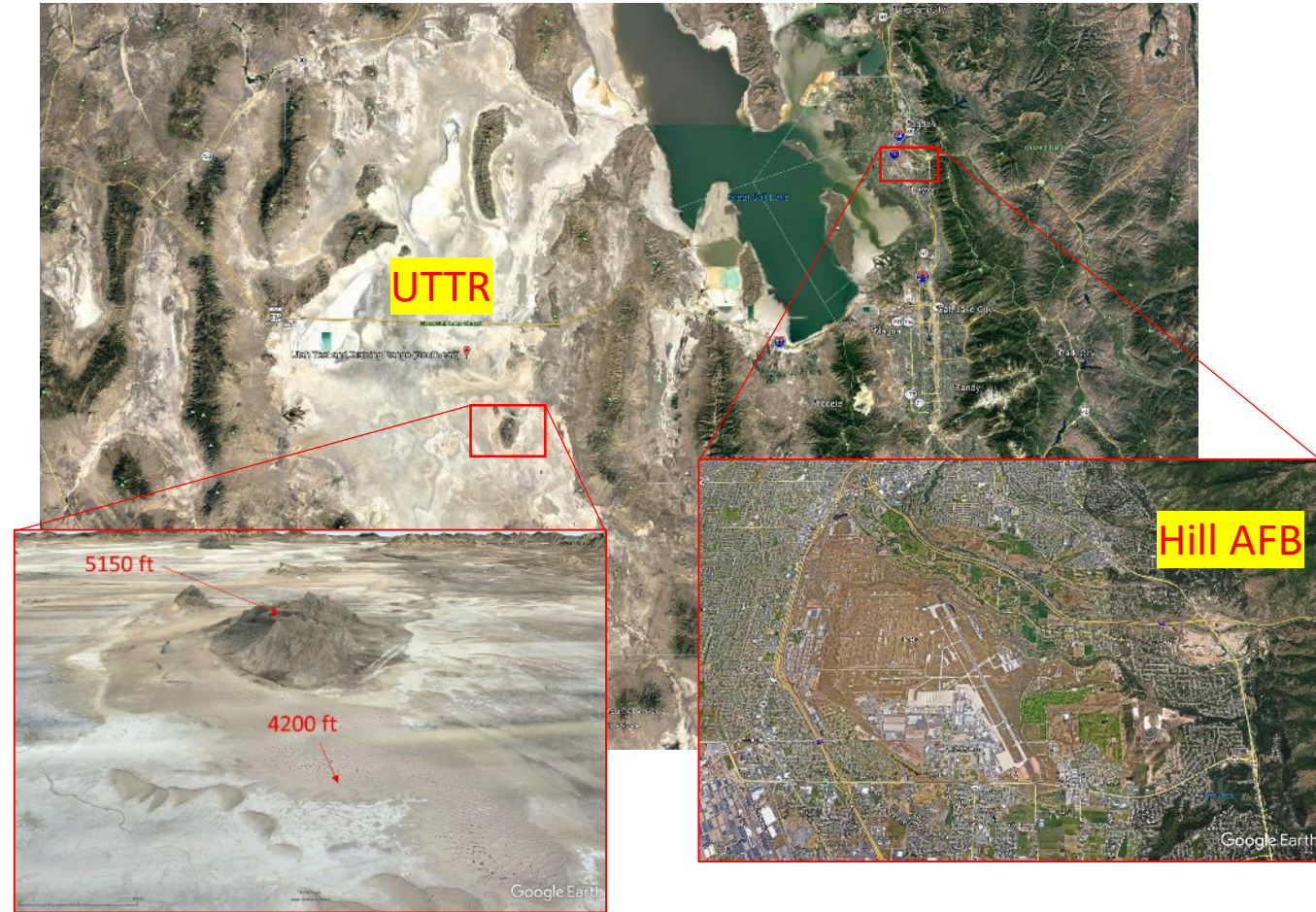
- **Challenge: Interoperability between airborne radar and 5G cellular system in 3.1-3.45 GHz Band**
- **Approach: Develop Sharing/Coexistence System (SCS) prototypes (DSA-enabled) and evaluate with real-world, at-scale networks**
 - Build 5G network infrastructure and devices to enable experiments
 - Develop SCS prototypes and evaluate in controlled environments
 - Promising system can be evaluated with over-the-air (OTA) experiment with users and airborne radar systems



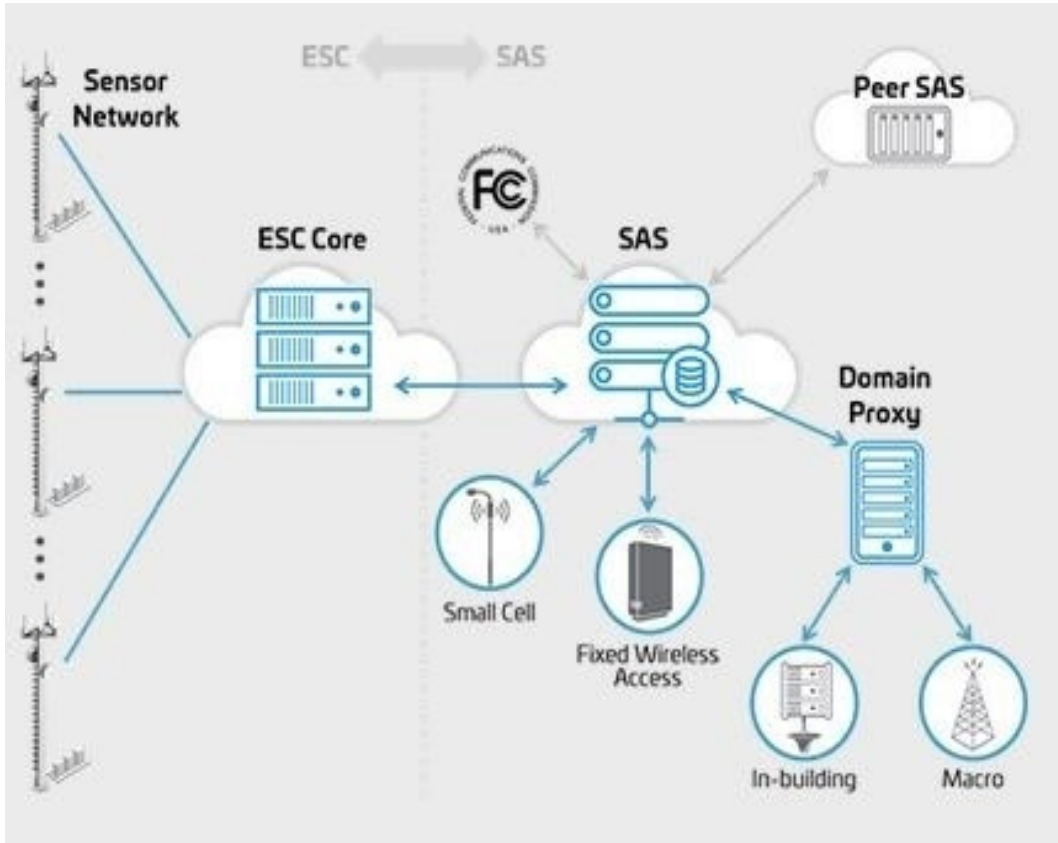
Build 5G network infrastructure and devices to enable experiments



- **Goal: Construct a 5G network that enables user to use some current 5G (and 4G) bands and allows for operations to be shifted to 3.1-3.45 GHz for experimentation**
 - Sufficient MNO coverage for non-Target Band
 - Target Band gNodeB that encompass:
 - Goal: 3.1 to 4.2 GHz (multiple bands)
 - Threshold 3.1-3.45 GHz
 - Handsets that include 3.3-3.45 GHz
- **Development items to include entire target band of 3.1-4.2 GHz**
- **Two areas of coverage**
 - Hill AFB: >90% coverage of population work area
 - UTTR: multiple cell-on-wheels (COWs) that enable emplacement at higher elevation points within UTTR with backhaul to fiber POPs
- **Private network with external network connectivity**



Develop SCS prototype system and Evaluate in controlled environments



CBRS DSA System (for illustrative purposes)

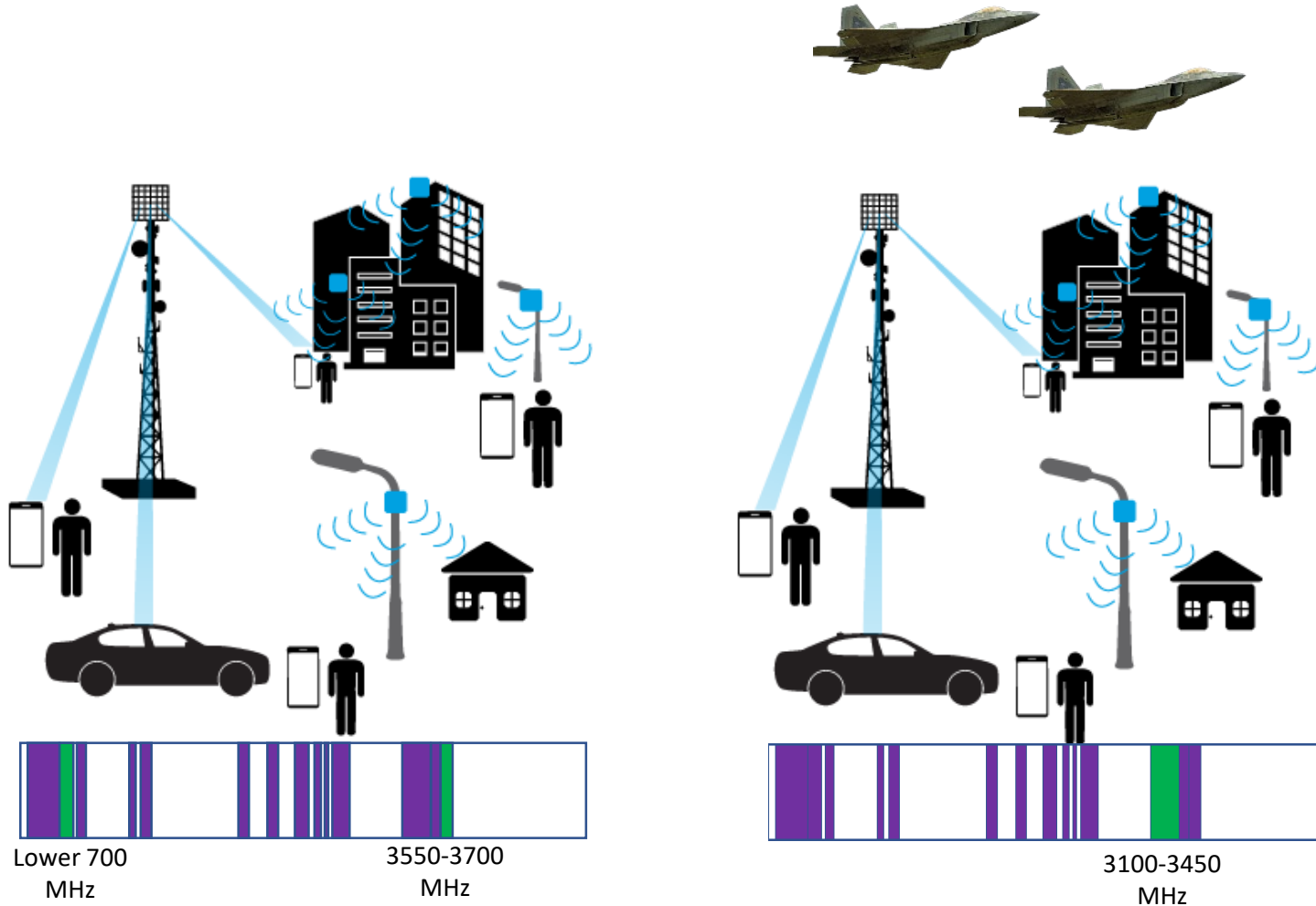
Lab-Based + Simulation

EMC Evaluation

InSitu Testing

- **Goal:** Non-cooperative (no control of legacy user) sharing/coexistence
- **Approach:** Modified higher TRL (i.e. ESC/SAS) and new lower TRL sharing/coexistence systems (SCS)
 - Canonical radar operation models for development and M&S testing
 - Coexistence testing with controlled RF signals using EMC facilities
 - Over-the-air (OTA) experiment with 5G users (Hill AFB and UTTR) and airborne radar systems
- **Metrics:**
 - Spectrum enabled for sharing
 - Intensity of allowed spectrum usage (users, transmit power)
 - Coverage impact to airborne radar

Over-the-Air Experimentation (example)



- Base personnel devices (dual SIM) will provide the test signals for real-world, at-scale experimentation
- Approach: Use of 5G core to control spectrum used by base-station and devices
 - Pre-experiment, devices use current allocated cellular spectrum with MNO facilities; use of “SIM A”
 - During experiments, controlled amount of users will be switched via moving to “SIM B” to DSA bands for evaluation; users should not notice any change
 - Kill switch to revert to pre-experiment configuration when necessary