



PECAN's Integrated Sounding Array (PISA) Stations

Dave Turner

National Severe Storms Laboratory / NOAA

PECAN Planning Meeting

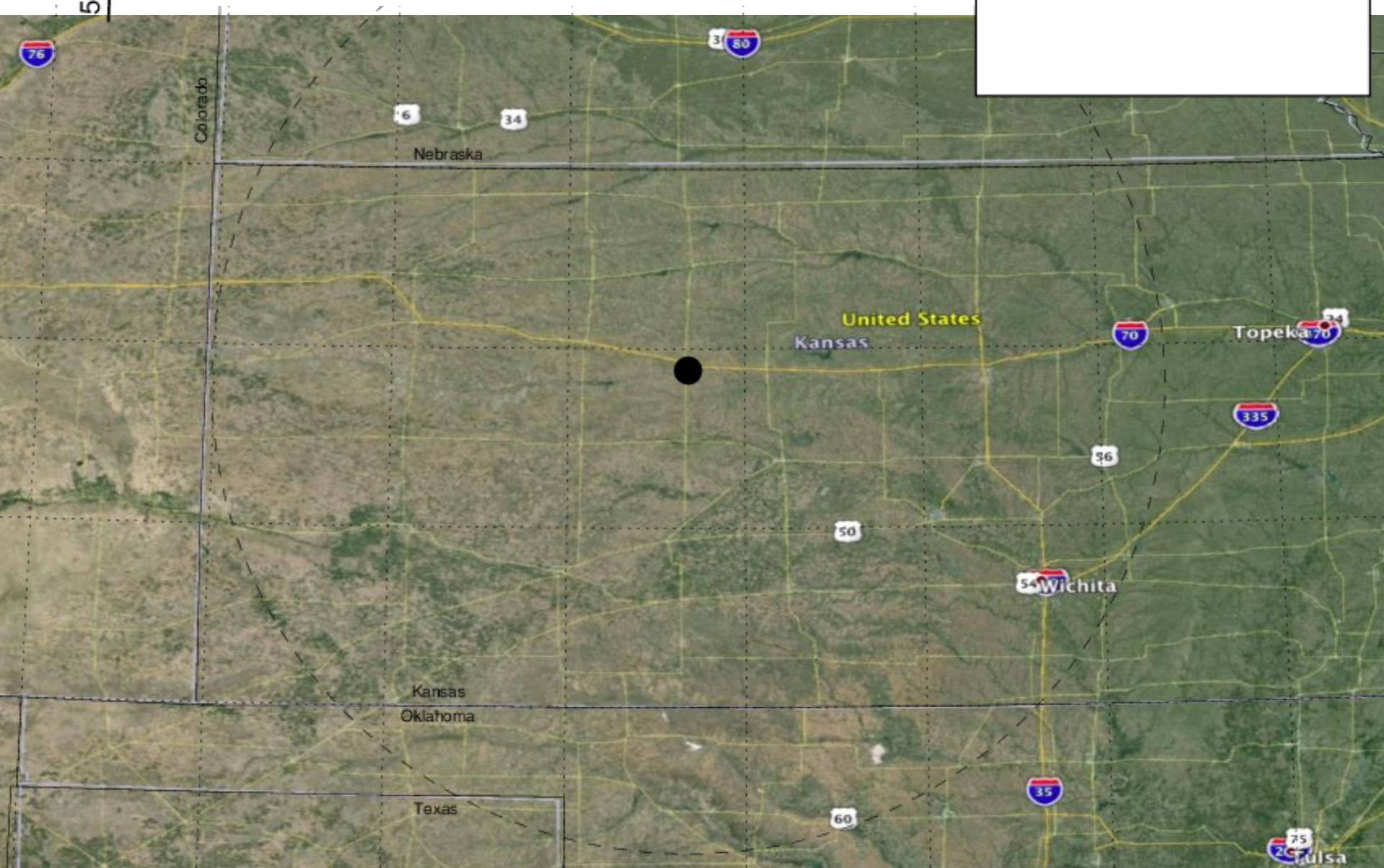
Boulder, Colorado

12-14 May 2014

50 km
50 km

PECAN Domain and PISAs

● Hays Operations Center
Dashed circle: R=300 km from Hays



50 km
50 km

PECAN Domain and PISAs

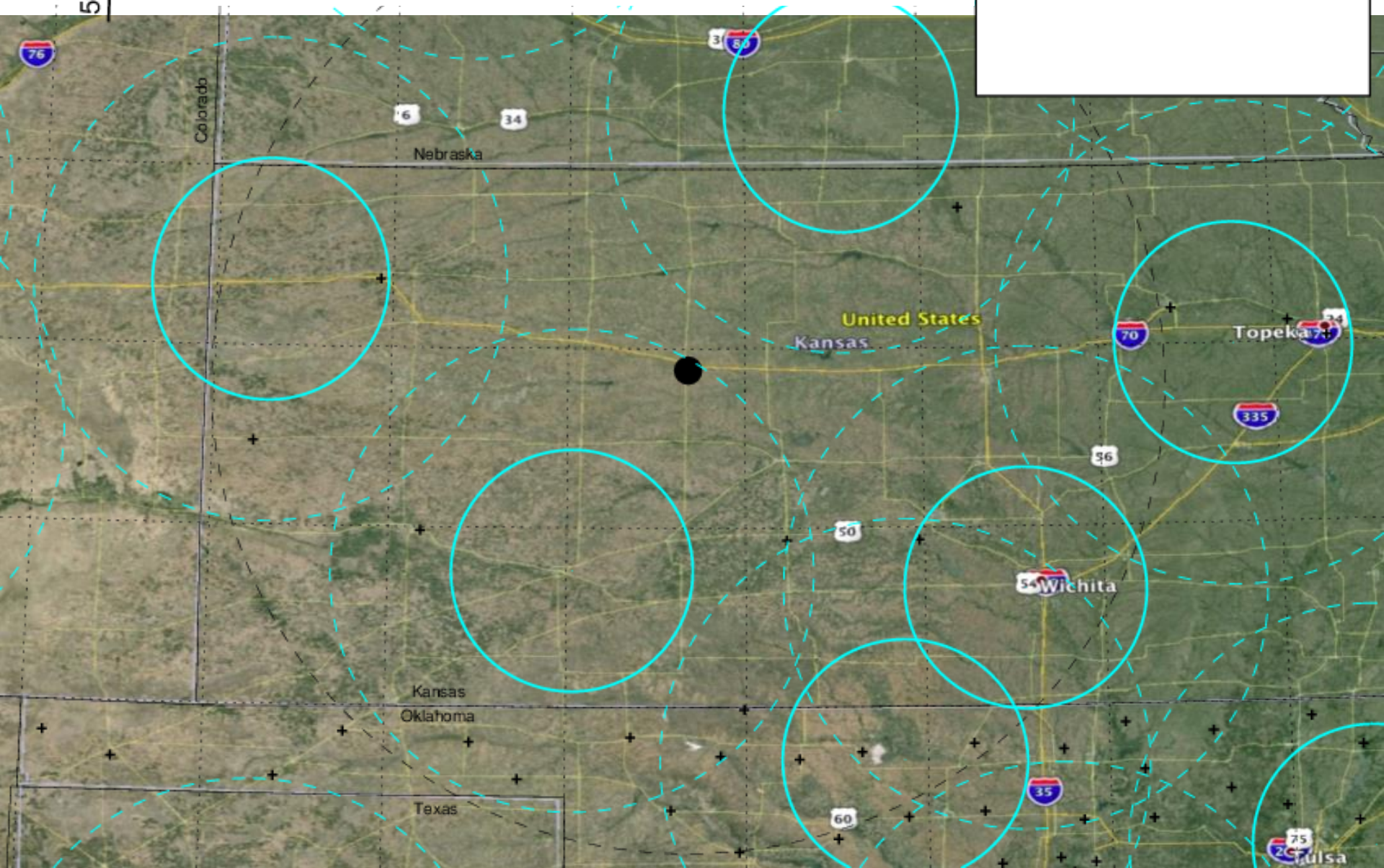
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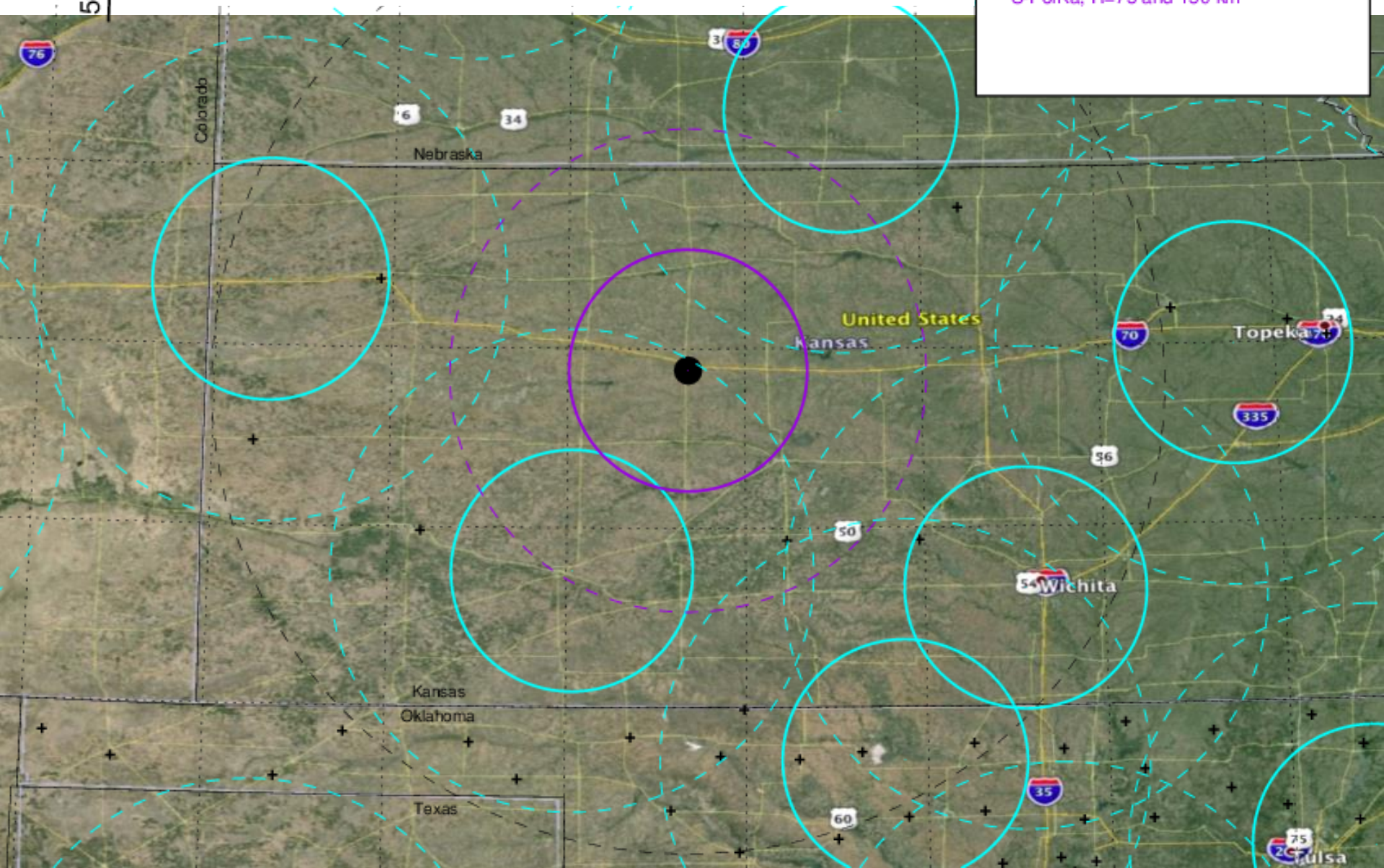
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- NWS WSR-88D, R=75 and 150 km



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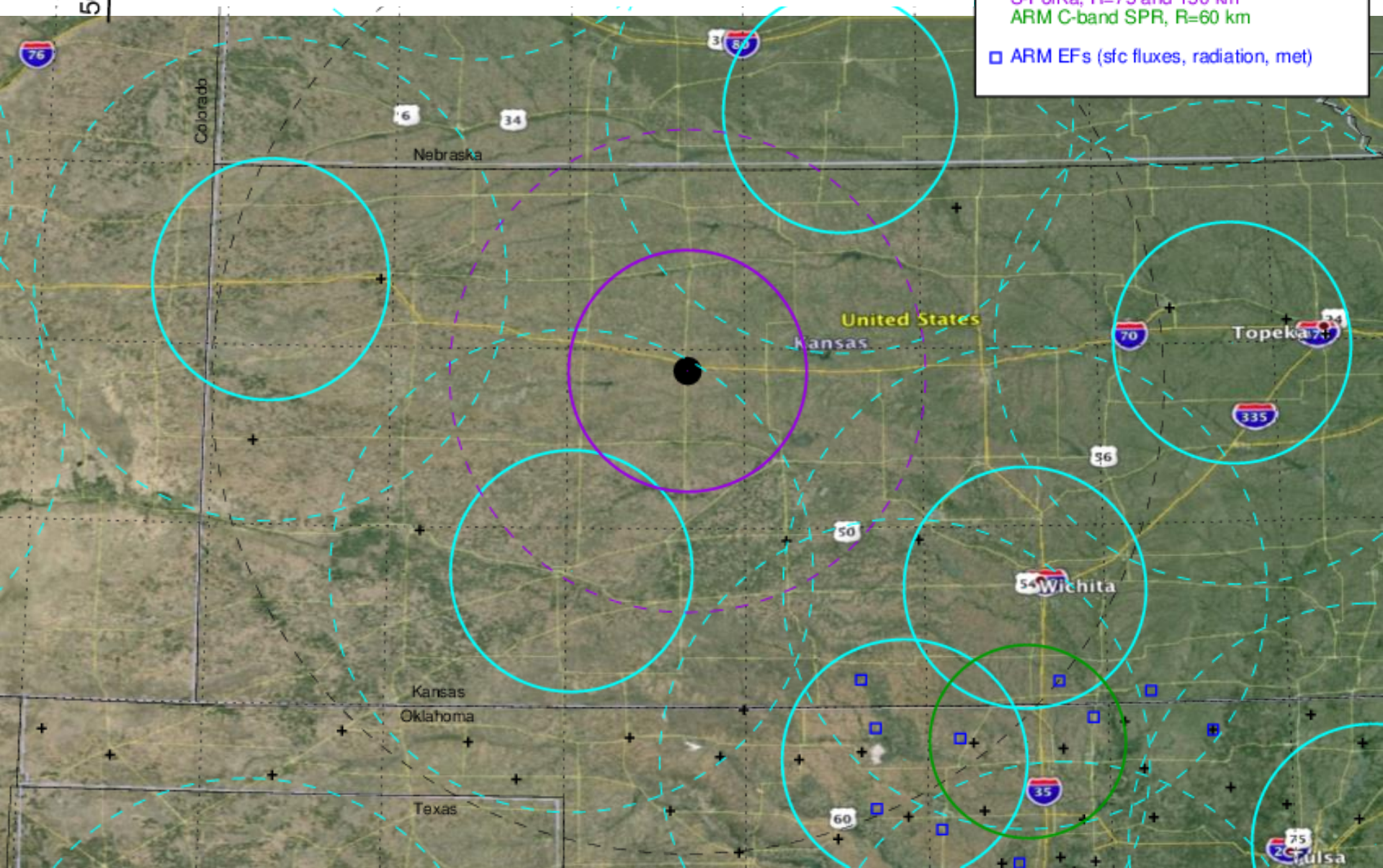
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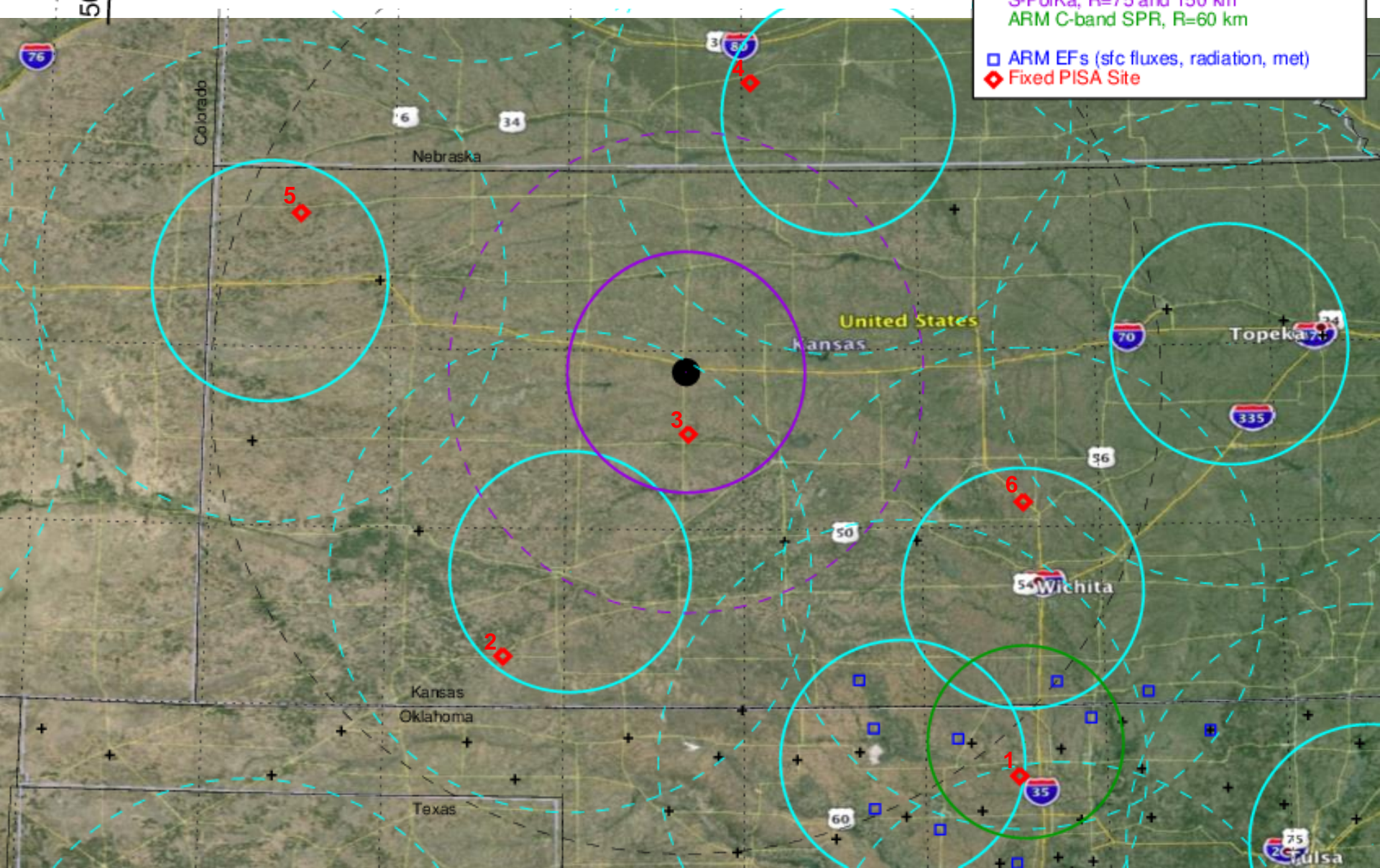
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- ARM C-band SPR, R=60 km
- ARM EFs (sfc fluxes, radiation, met)



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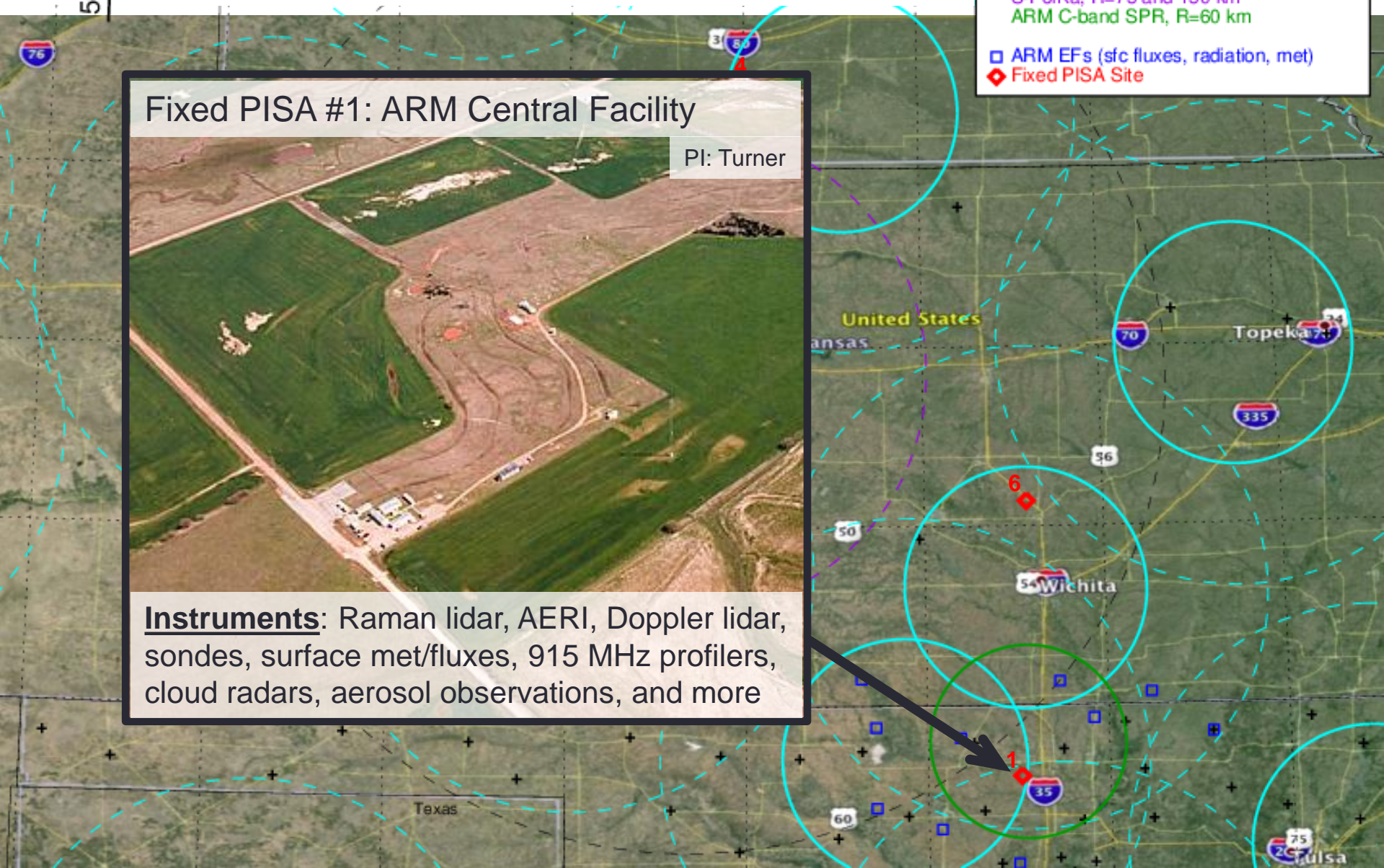
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Fixed PISA #1: ARM Central Facility

PI: Turner



Instruments: Raman lidar, AERI, Doppler lidar, sondes, surface met/fluxes, 915 MHz profilers, cloud radars, aerosol observations, and more



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PECAN Domain and PISAs

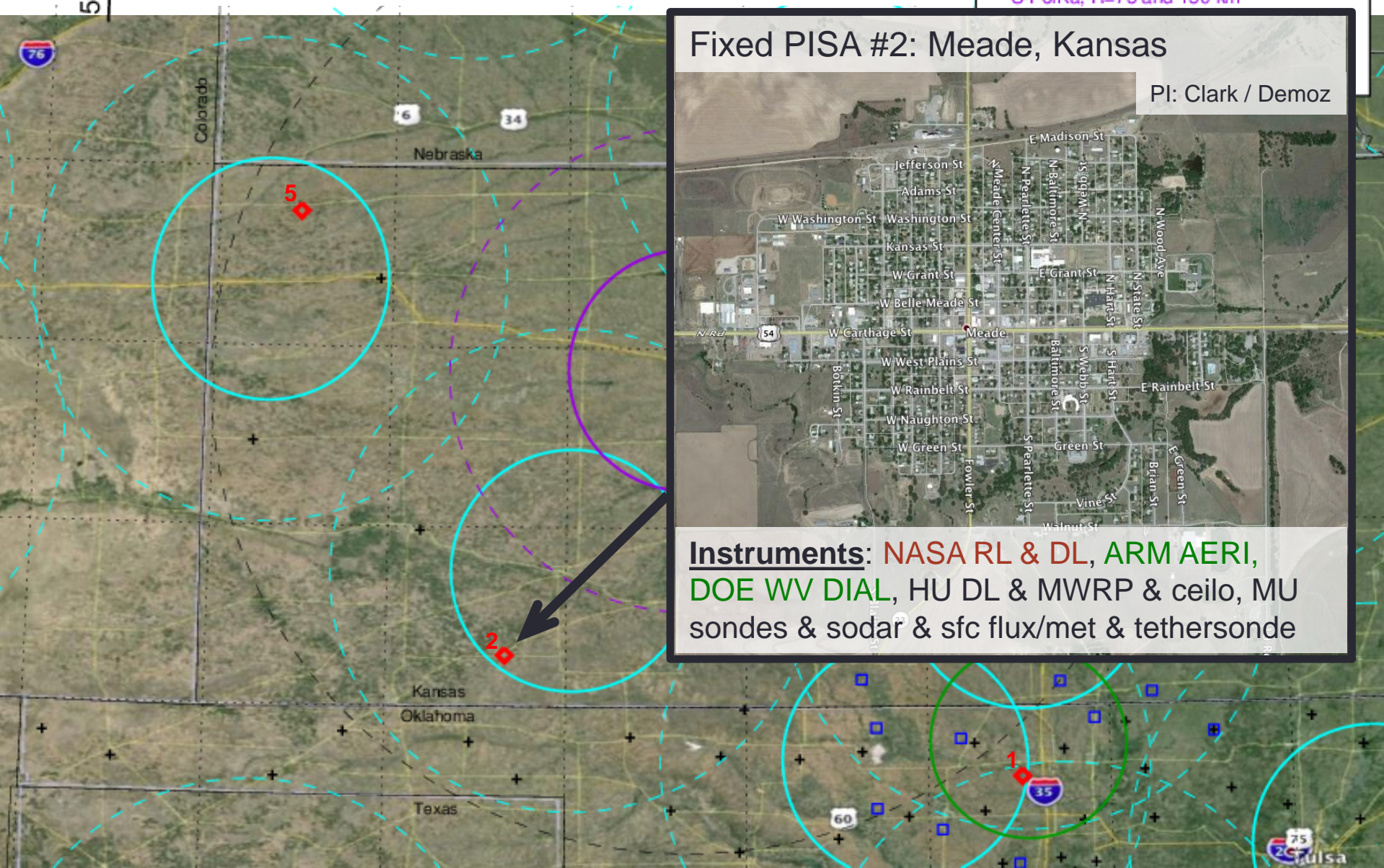
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Fixed PISA #2: Meade, Kansas

PI: Clark / Demoz



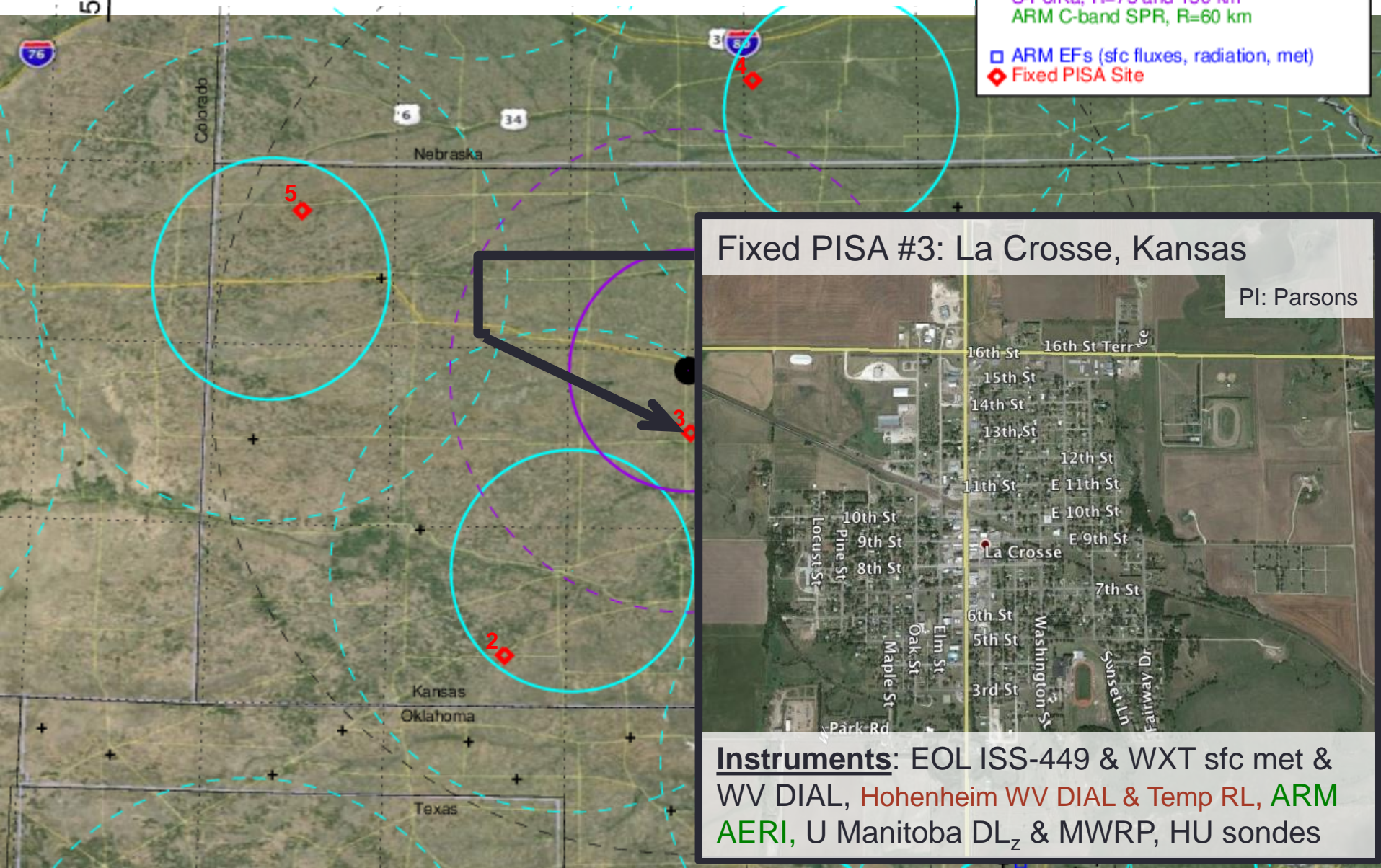
Instruments: NASA RL & DL, ARM AERI, DOE WV DIAL, HU DL & MWRP & ceilo, MU sondes & sodar & sfc flux/met & tethersonde



PECAN Domain and PISAs

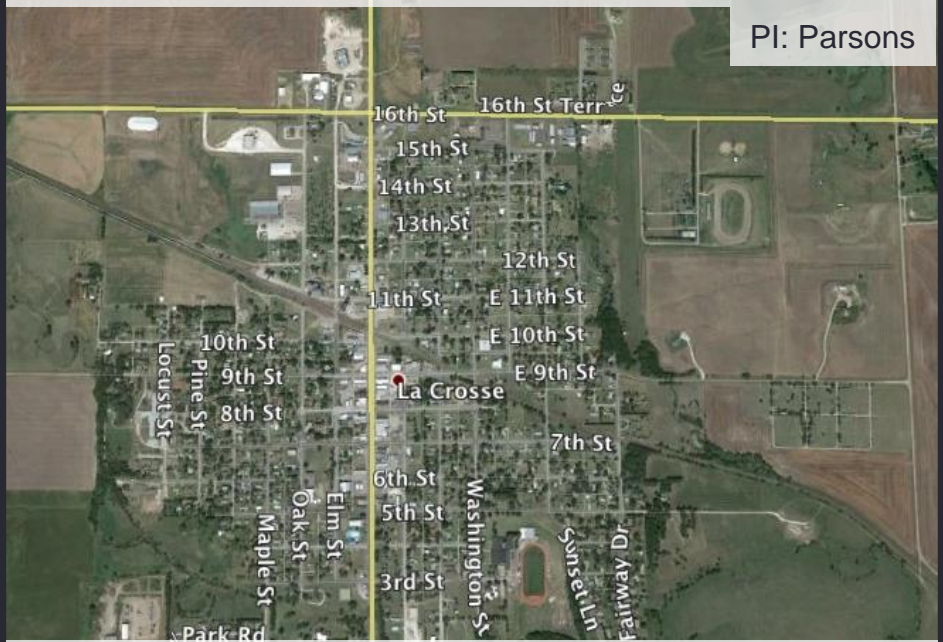
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Fixed PISA #3: La Crosse, Kansas

PI: Parsons

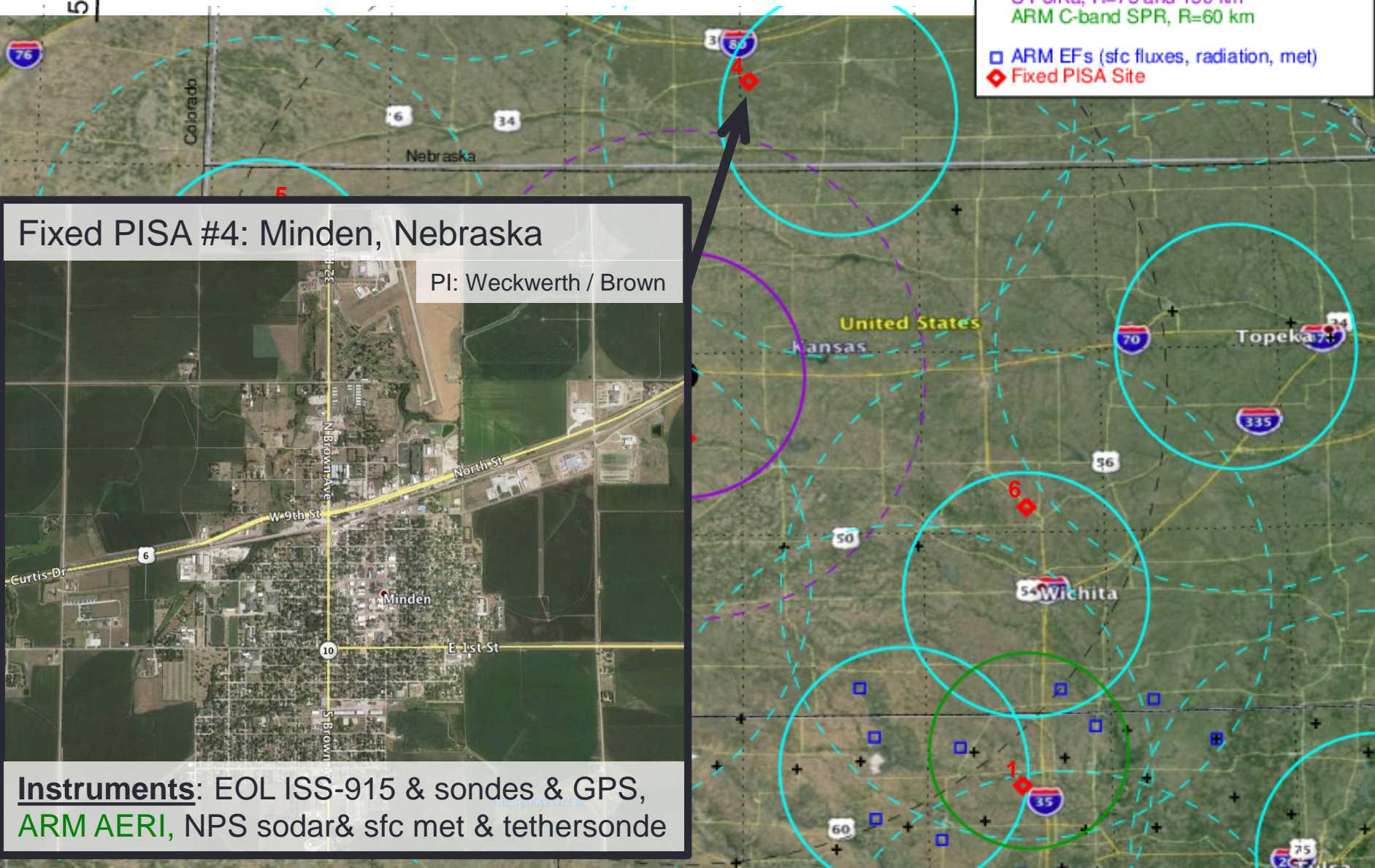


Instruments: EOL ISS-449 & WXT sfc met & WV DIAL, Hohenheim WV DIAL & Temp RL, ARM AERI, U Manitoba DL_z & MWRP, HU sondes

PECAN Domain and PISAs

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Fixed PISA #4: Minden, Nebraska
PI: Weckwerth / Brown

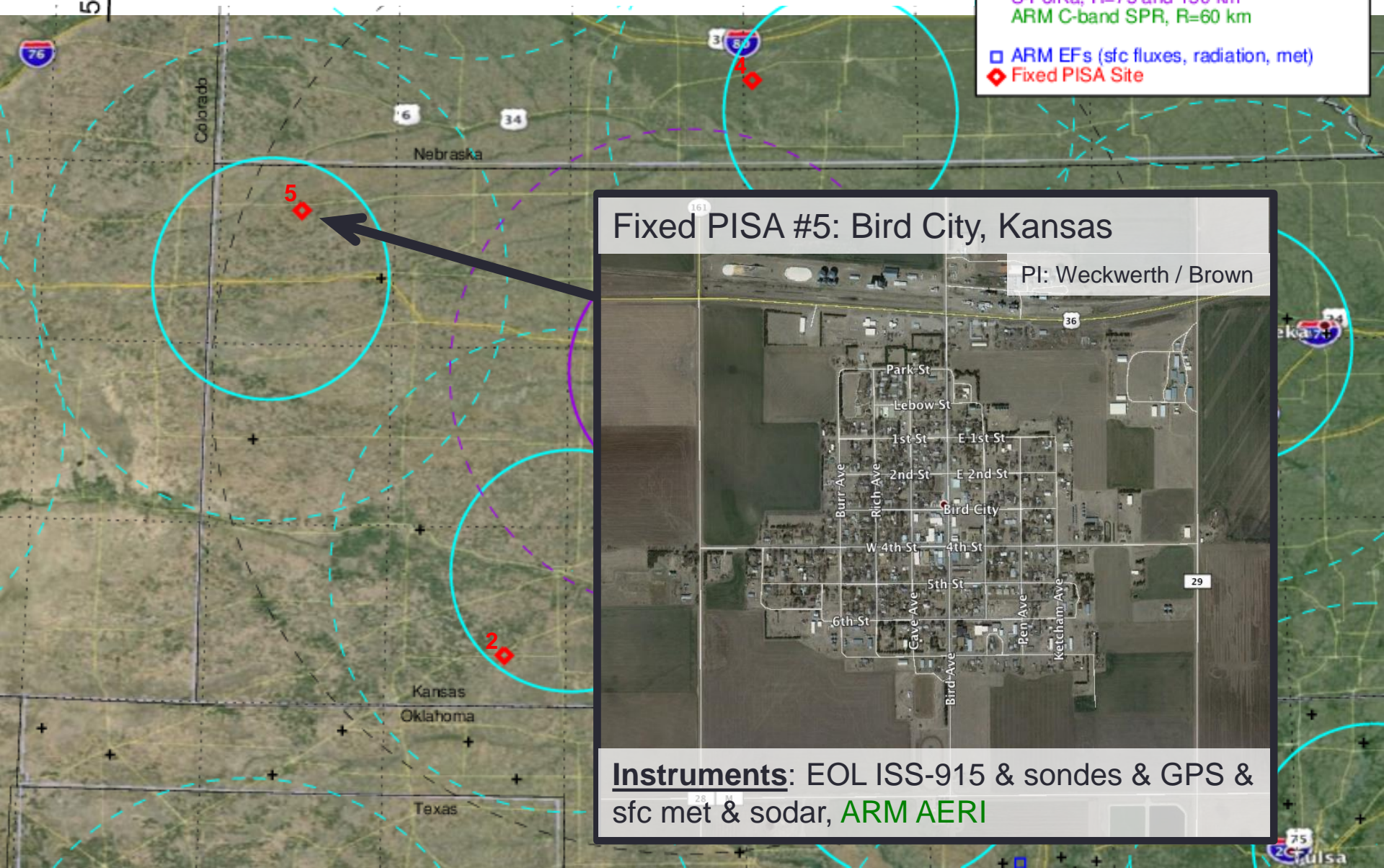


Instruments: EOL ISS-915 & sondes & GPS, ARM AERI, NPS sodar & sfc met & tethersonde

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Fixed PISA #5: Bird City, Kansas

PI: Weckwerth / Brown



Instruments: EOL ISS-915 & sondes & GPS & sfc met & sodar, **ARM AERI**

50 km
50 km

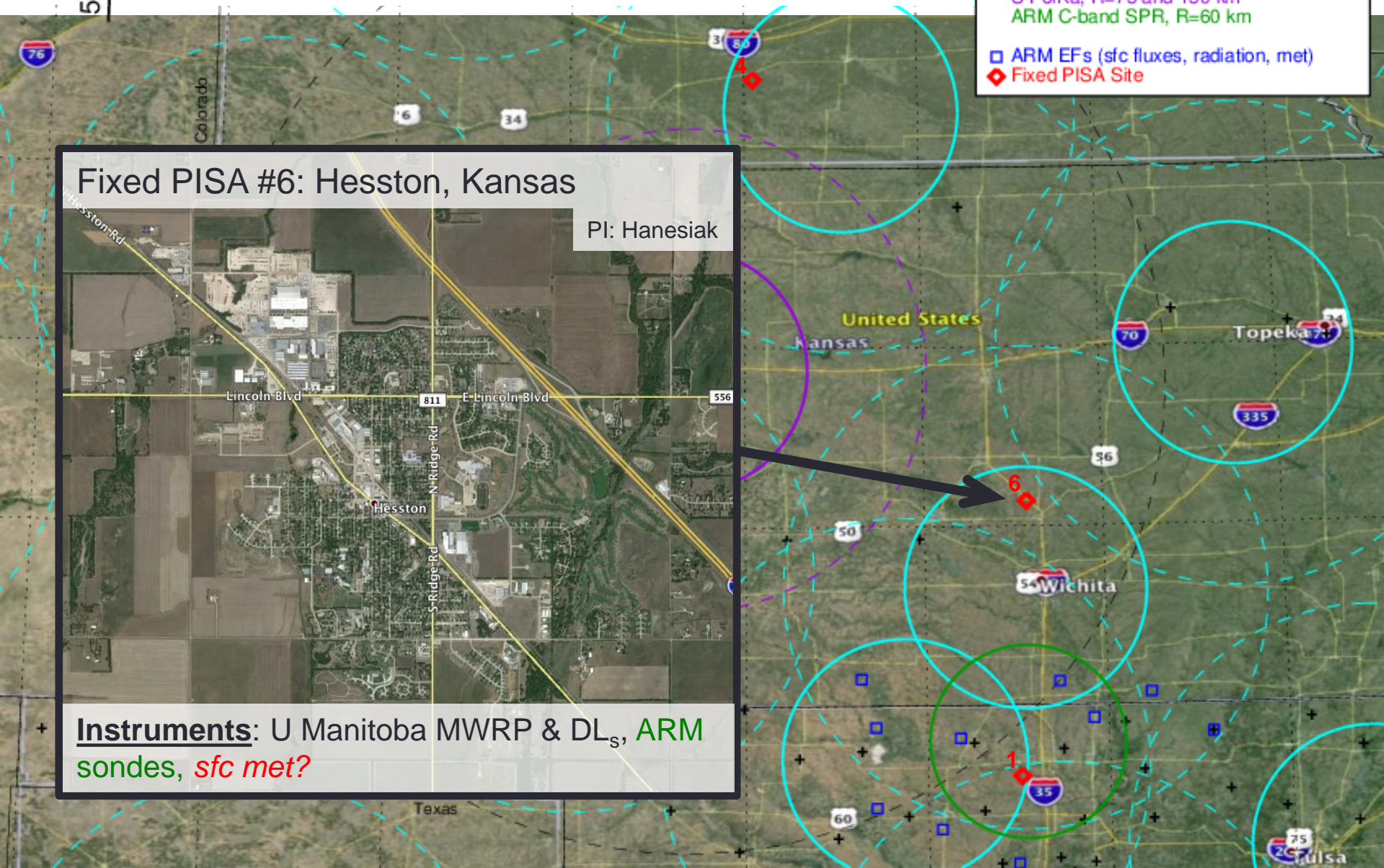
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- ◆ Fixed PISA Site

Fixed PISA #6: Hesston, Kansas

PI: Hanesiak

Instruments: U Manitoba MWRP & DL_s, ARM sondes, *sfc met?*



Mobile PISA #1: CLAMPS

OU / NSSL Collaborative Lower Atmospheric Mobile Profiling System

- Instruments
 - AERI
 - MWRP
 - DL
 - Sfc met
 - Sondes
- Status: Under construction
- Testing: Fall'14



Mobile PISA #2: MIPS

UAH Mobile Integrated Profiling System

- Instruments

- 915 MHz profiler
- CL51 ceilometer
- MWRP
- X-band radar
- DL
- Mini sodar
- Sfc met
- Sondes

PI: Knupp



- Status:
Ready!

Mobile PISA #3: SPARC

UW-Madison SSEC Portable Atmospheric Research Center

- Instruments
 - AERI
 - DL (rented)
 - CL51 ceilometer
 - Sfc Met
 - Sondes
- Status: Under construction
- Testing: Summer'14

PI: Feltz / Smith



Mobile PISA #4: MISS

NCAR EOL Mobile 915 Integrated Sounding System

PI: Brown / Weckwerth



- Instruments
 - 915 MHz profiler
 - Sfc Met
 - Sondes
- Status: Ready!

Rover: TWOLF / FM-CW radar / RadXPol

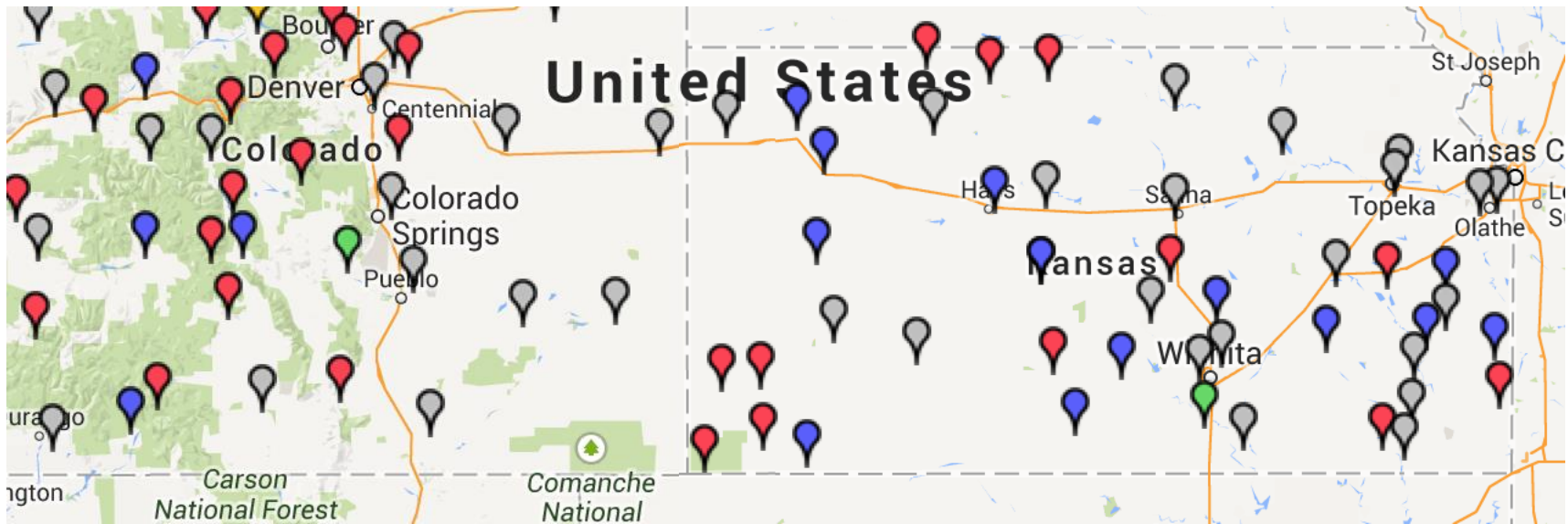
NPS / CIRPAS Truck-mounted Wind Observing Lidar Facility and OU

PI: Bluestein / Parsons



NWS AWOS Stations

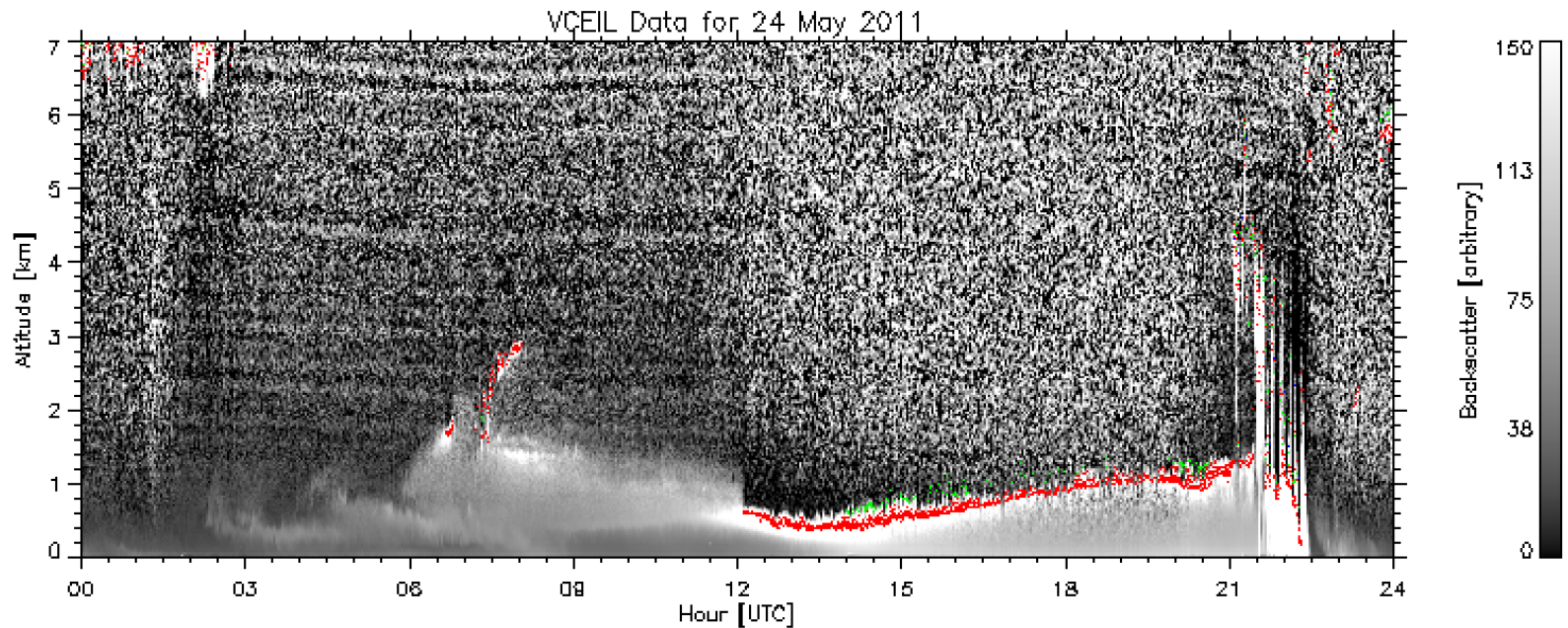
Ceilometers available for detecting waves and BL structures?



Weather Station Types											
	AWOS A		AWOS AV		AWOS I		AWOS II		AWOS III		AWOS IIIP
	AWOS IIIT		AWOS IIIP/T		ASOS		AWSS		AWOS IV		Misc.

NWS AWOS Stations

Ceilometers available for detecting waves and BL structures?



- Belay Demoz is working with NWS to get access to some of these ceilometers to save the backscatter profiles
- Some good progress has been made
- If unable to get access by PECAN, Belay will bring 5-6 CL31s to PECAN domain -- deploy at PISA sites (?)

Radiosonde Problem:

Vaisala
I-Met

- We have a lot of radiosondes at our disposal:
 - **FP1** (ARM): 21, 00, 03, 06, 09, 12, 18 UTC daily throughout PECAN
 - **FP2** (MU): 150 sondes
 - **FP3** (HU): ??
 - **FP4** (EOL GAUS): 130 sondes
 - **FP5** (EOL GAUS): 130 sondes
 - **FP6** (ARM): 150 sondes
 - **MP1** (CLAMPS): 110 sondes
 - **MP2** (MIPS): 120 sondes
 - **MP3** (SPARC): 110 sondes
 - **MP4** (EOS MGAUS): 140 sondes
 - **RSV-1, RSV-2, RSV-3**: 360 sondes
- Potentially 15 sondes in the air at any time!
- How to allocate 401-406 MHz band ?

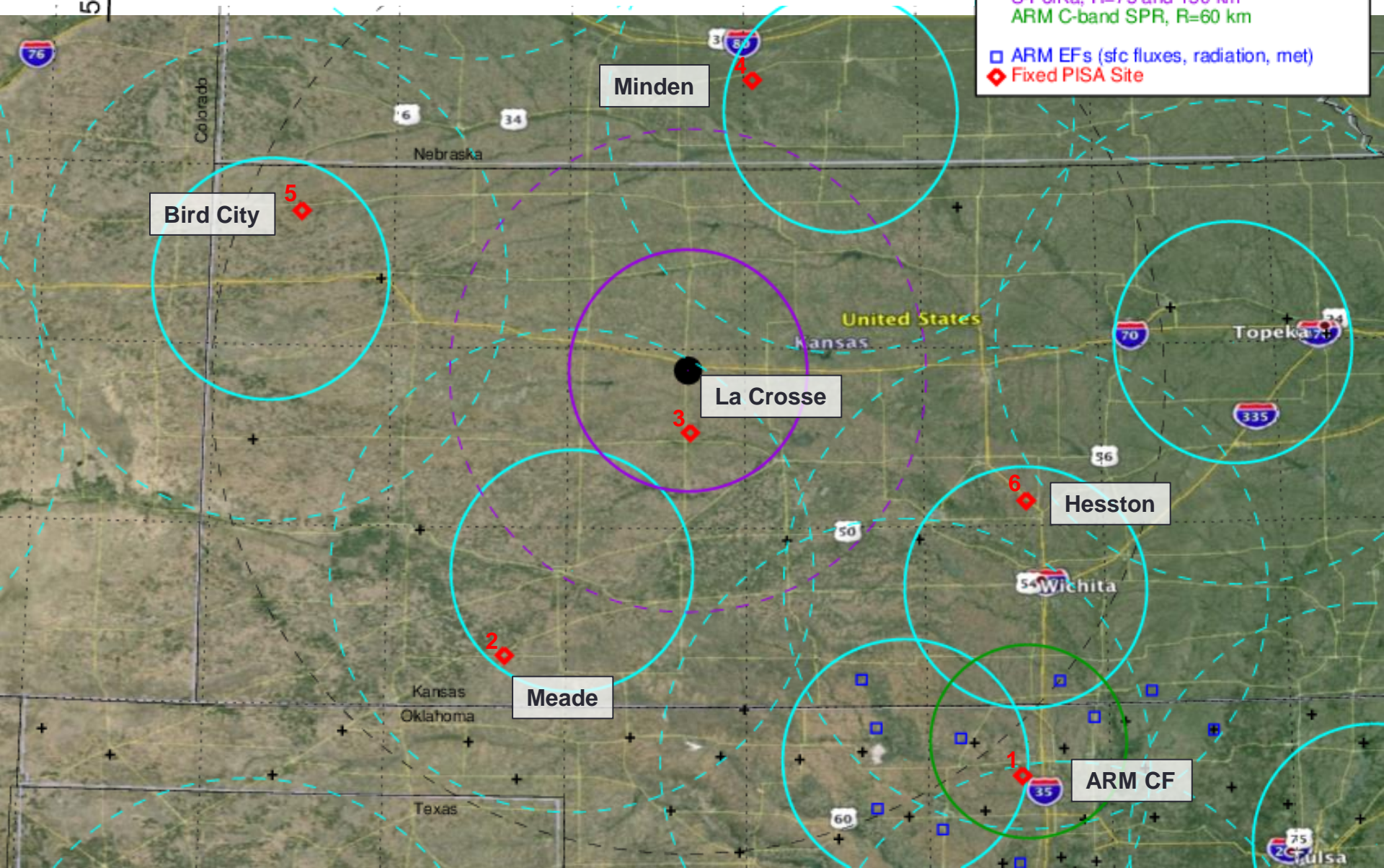
Intercomparisons & Consistency

- Important to have (to degree possible) consistent data across all PISAs (fixed and mobile)
- Having AERIs at (hopefully) 7 of 10 PISAs is key
 - Retrievals from all data processed using same AERIOe algorithm
- Have 5 MWRs in field (3 at FPs, 2 in MPs)
 - Discussing LN2 calibration both pre/post PECAN
 - Discussing using same physical retrieval (MWRoe) for all MWR datasets post-PECAN; real-time retrievals come from current statistical retrievals owned by each PI
- Intercomparison effort will have 2 components:
 - Compare all T/q/wind sensors at a PISA relative to each other (site centric)
 - Use airborne assets (e.g., LASE, MARL) to link results between PISA sites

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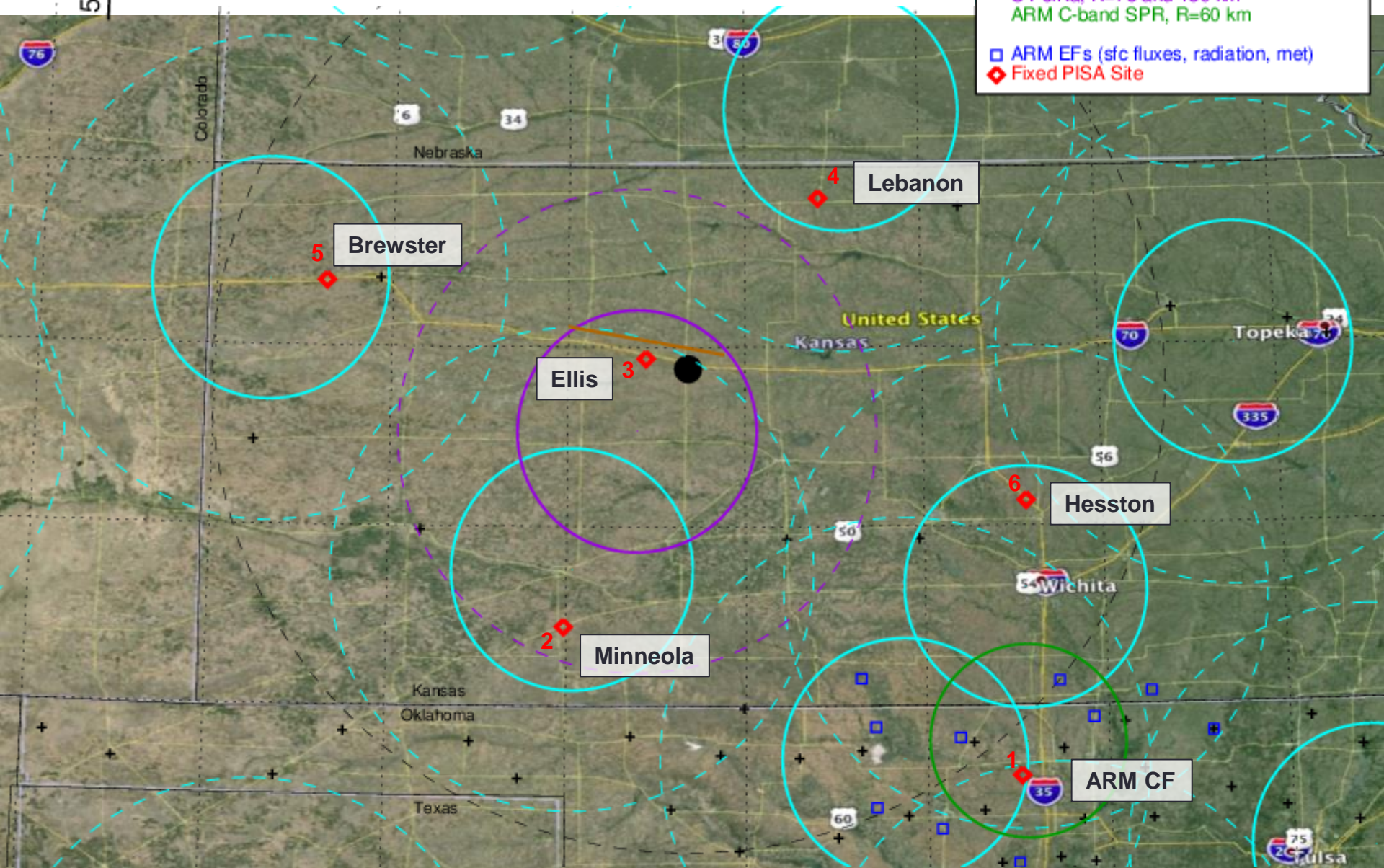
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Deploying the MPs for an IOP

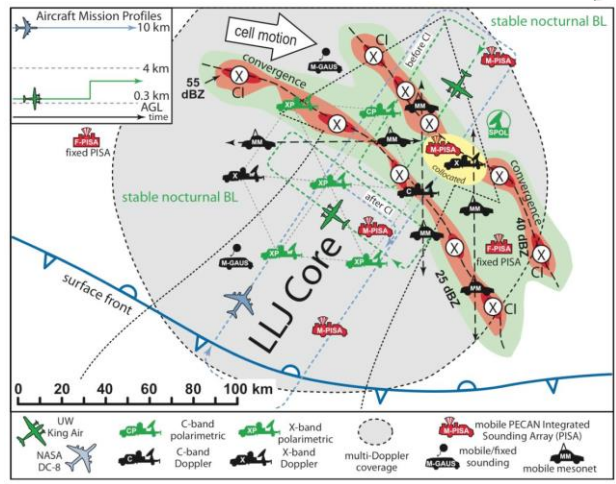
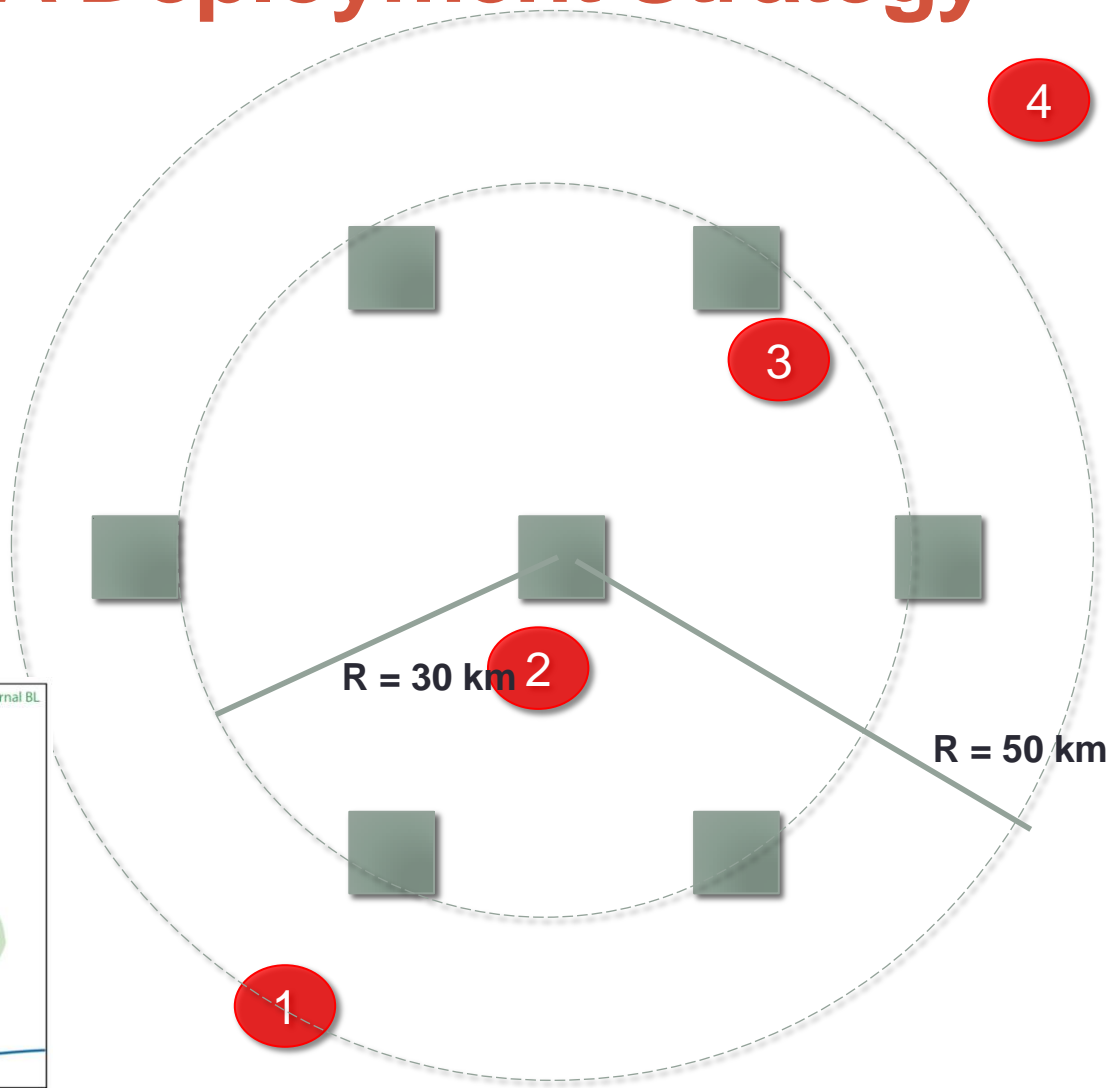
- Order of operations:
 - Forecast discussion (CS, SC)
 - Mission decision for the day (SC, SC)
 - Determine optimal locations for each MP (CS, SC, PC)
 - Take into account mission, location of FPs, strengths of each MP
 - Communication of locations to each MP-PI (PC)
 - MPs deploy to location
 - MP-PIs inform PC of arrival on site, and then start setup
 - MP-PIs inform PC of start of data collection
 - Continuously: PC informs MP-PIs of evolving conditions, and vice versa.
 - Agreement on time to end data collection
 - Data collection ends, MPs start tear down, communicate to PC
 - MPs RTB or alternate hotel, based on 2nd day forecast
 - MP-PIs inform PC of safe arrival
- Key information needed from each MP PI:
 - Any particular general siting requirements (e.g., away from trees)
 - Time to set up after arrival on site
 - Time to tear down at end of IOP

CS – Chief Scientist for the day
SC – Steering committee at ops center
PC – PISA coordinator at ops center

Mobile PISA Deployment Strategy

CI Mission

Linear array with
~ 40 km separation

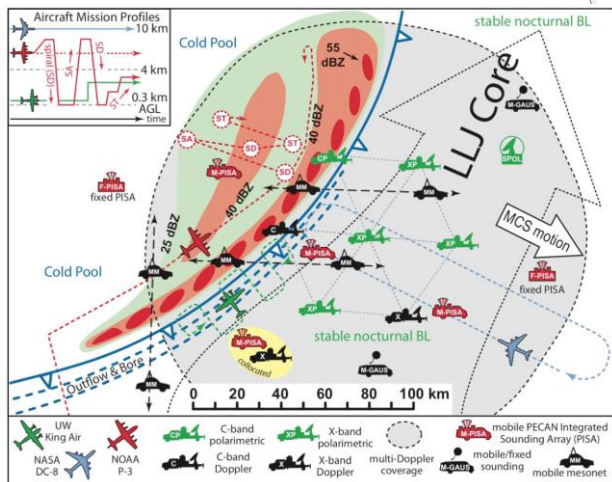
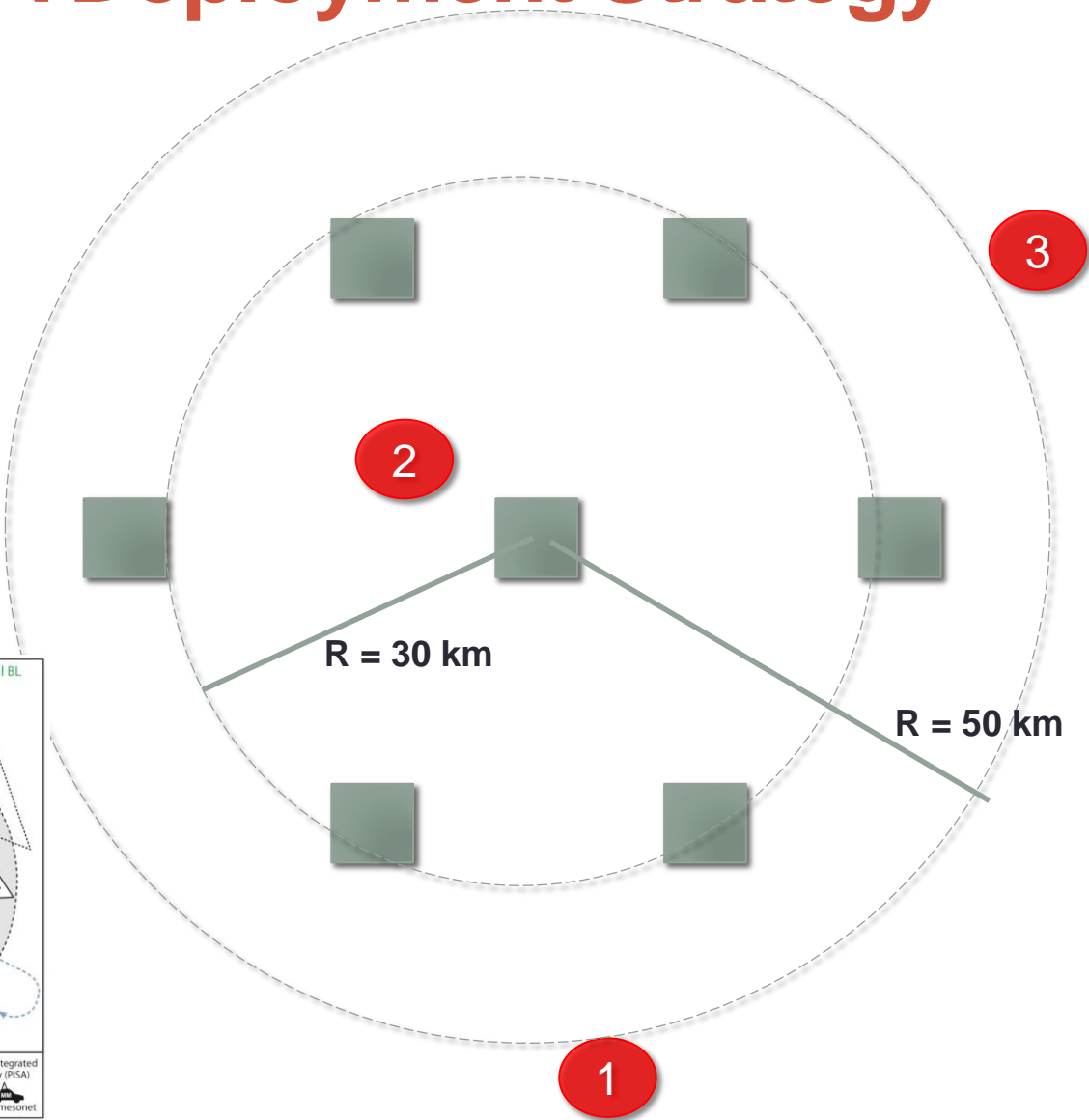


Mobile PISA Deployment Strategy

MCS Mission

4

Triangular formation with a center point, with 50 km distance from center



Mobile PISA Deployment Strategy

Bore Mission

Square formation,
with 50 km distance
from center

