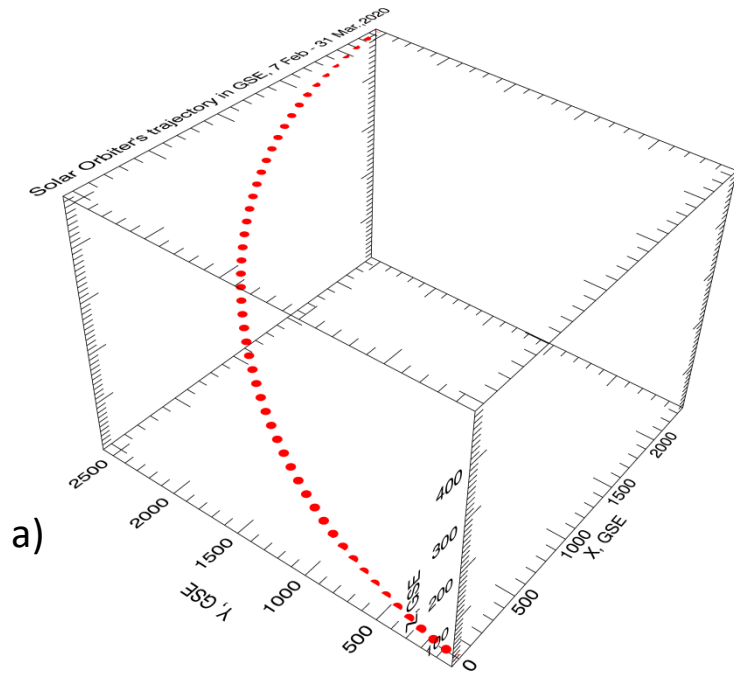


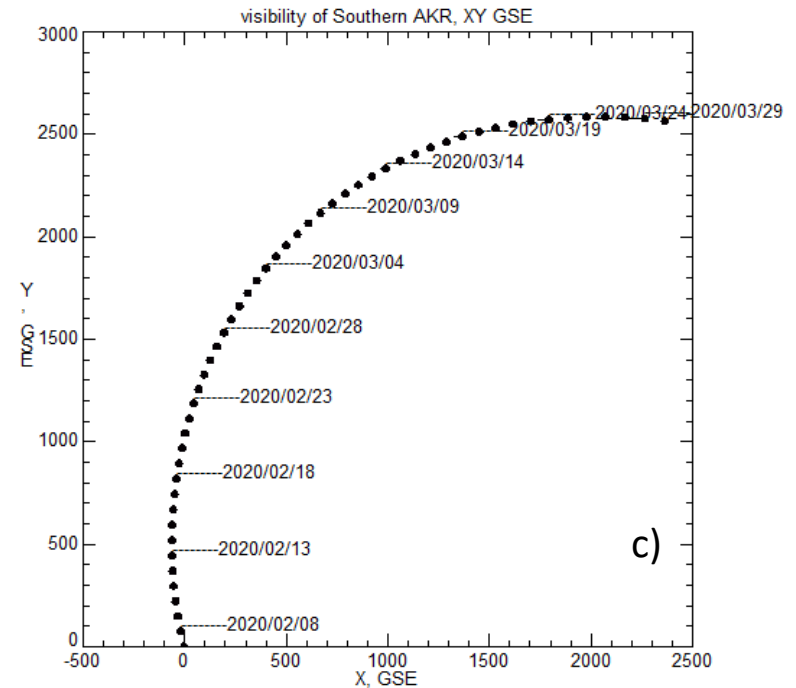
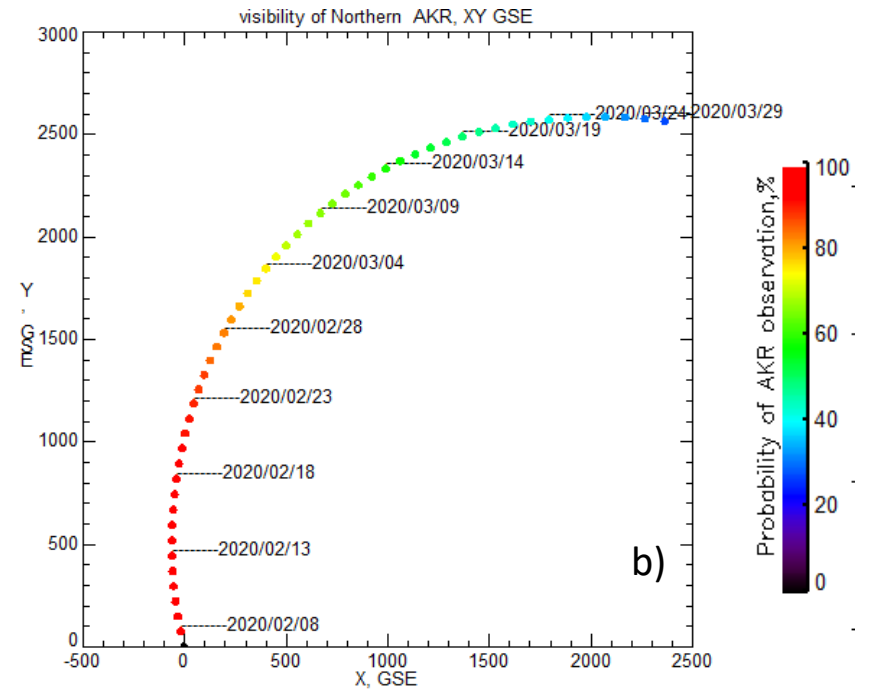
Visibility of AKR sources – Prepared by M. Panchenko

- We have estimated on which parts of the Solar Orbiter trajectory (when the roll maneuvers are scheduled) the AKR sources can be observed.
- AKR is mainly observed in the nightside part of the terrestrial magnetosphere. A bulk of its occurrence frequency distribution was concentrated in the evening sector with a peak near 21 - 22 h of magnetic local time (MLT) and 70° invariant latitude.
- For the estimation of the visibility of the AKR sources we used a simple geometrical model of the AKR source visibility with a straight-line propagation of the radio emission. In the model the sources of the AKR have been located in the region of 19 - 23 h of MLT and 65° - 75° of invariant latitudes at altitudes corresponds to the 300 kHz – peak of AKR spectral density.
- We have assumed that AKR beam is a filled cone with half-open angle of $\alpha=70$ degree relative to the local magnetic field line.
- For a given position of the spacecraft and AKR source we have calculated the angle β between vector of magnetic field in the positions of the AKR sources and the vector of direction from the spacecraft position to the AKR source. When the angle $\beta > 180^\circ - \alpha$ (for Northern hemisphere) and $\beta < \alpha$ (for Southern hemisphere) than the spacecraft is inside of the AKR beam and therefore, this given AKR source can be visible from the given spacecraft position.
- The probability of the AKR observation for each position of the spacecraft is calculated as relation between number of visible AKR sources to the number of all modeled AKR sources (the sources were placed at each 1/15 of MLT and 1° of invariant latitudes).

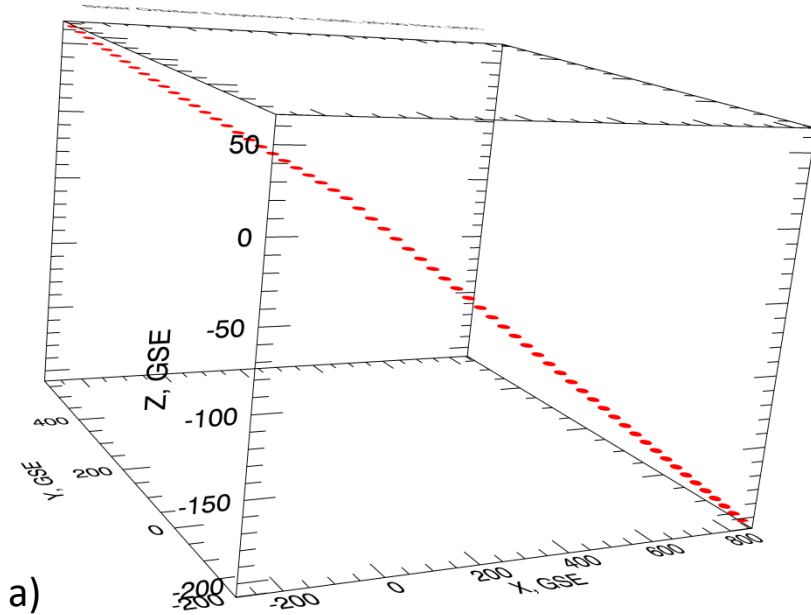
7 Feb - 31 Mar. 2020



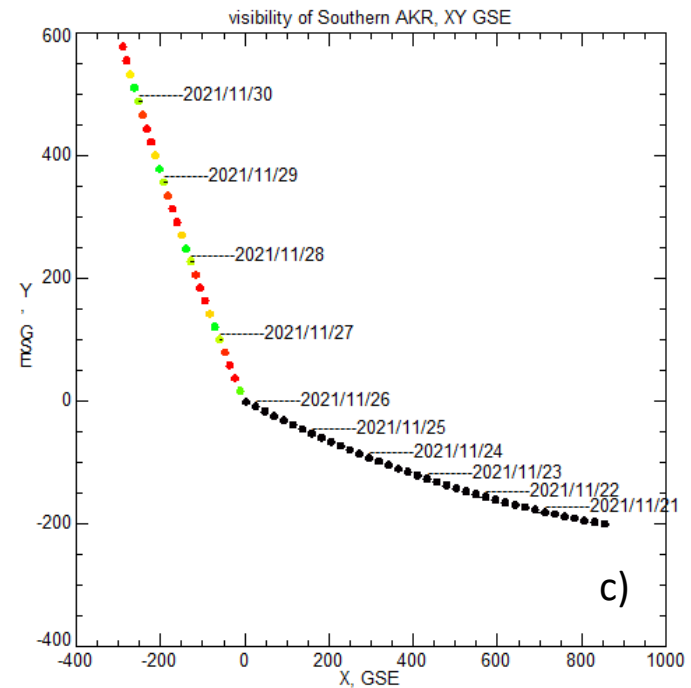
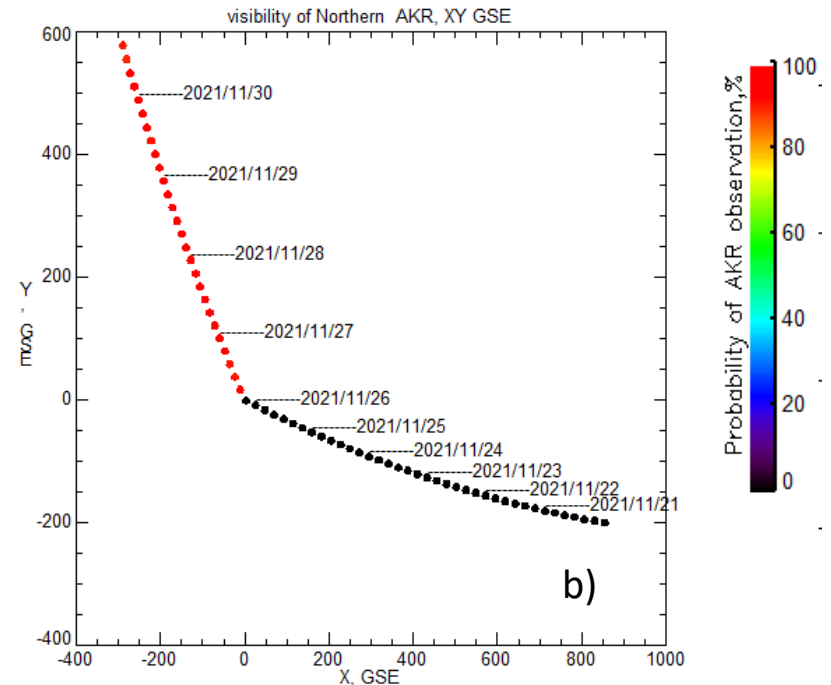
Probability of the AKR observation for Solar Orbiter trajectory between 7 Feb and 31 Mar. 2020. Panels (a) shows the spacecraft orbit in GSE coordinates. Panels (b) and (c) represent the probability of AKR observation from Northern and Southern sources along Solar Orbiter trajectory in XY plane. The probability of AKR observation is coded by color.



20 - 30 Nov 2021



Probability of the AKR observation for Solar Orbiter trajectory between 20-30 Nov 2021. Panels (a) shows the spacecraft orbit in GSE coordinates. Panels (b) and (c) represent the probability of AKR observation from Northern and Southern sources along Solar Orbiter trajectory in XY plane. The probability of AKR observation is coded by color.



AKR visibility periods

Solar Orbiter will be able to detect the AKR from the Northern or Southern hemispheres with high probability (above 70%) for the following periods of time:

- 8 Feb. - 5 Mar. 2020
- 26 Nov – 30 Nov 2021

The best time to perform roll maneuvers when the distance from Solar Orbiter to AKR sources will be between 50-300 R_E :

- 7 Feb 16:00 UT – 10 Feb 23:00 UT
- 26 Nov 16:00 UT – 28 Nov 12:00 UT