

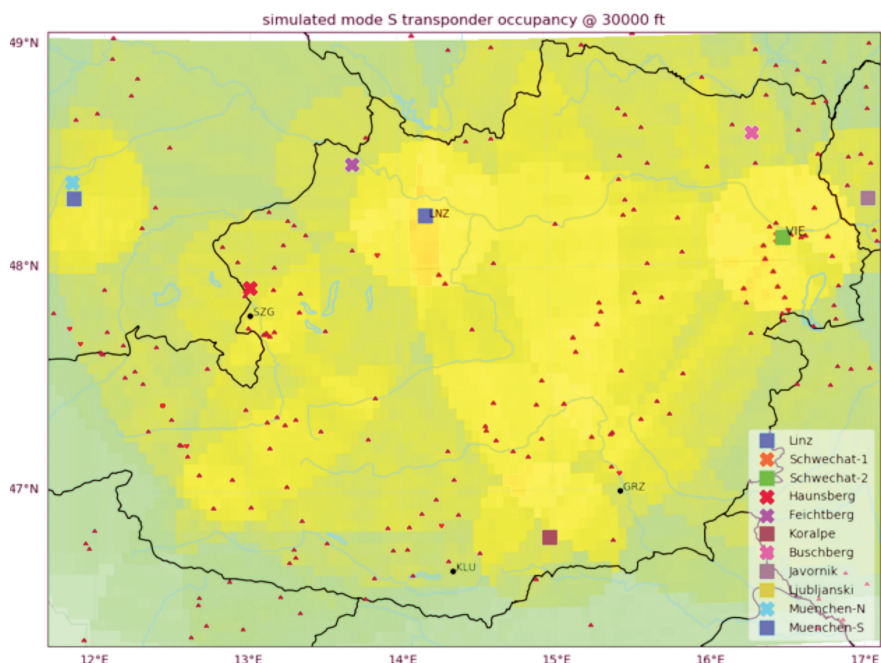


TOPAS - TRANSPONDER OCCUPANCY ANALYSIS FOR ANSPs OR OTHER AUTHORITIES

For ICAO Implementing Rules 2017/386 and 1207/2011 due until Jan. 2nd, 2020.

TOPAS is a software tool which calculates the percentage of occupancy of Mode A/C and Mode S transponders using real traffic scenarios, depending on the position of the transponder, the distribution of the interrogators and the distribution of other Mode S transponders.

This is done by simulating the 1030 MHz interrogations from surveillance systems and subsequently determining the transponder occupation time due to these interrogations. The results are presented as a map which shows the spatial distribution of the occupancy and possible hotspots:



In summary, the two ICAO regulations require ANSPs to ensure the integrity of the 1030 and 1090 MHz spectrum within their area of control. Therefore, Austro Control and the Institute for High Frequency of the Technical University of Graz (Austria) have developed a **Frequency Impact Study** and the **software tool TOPAS** which allows simulation of the occupancy of all present transponders.

The **Frequency Impact Study** investigates the occupancy of

the SSR frequencies 1030 and 1090 MHz due to interrogation of and replies from aircraft transponders caused by various sensors like SSR, Mode S radar, MLAT or - in the future - also ACAS systems. A special focus lies on the additional transponder load due to the introduction of MLAT, in addition to or as a replacement of one or more existing radar systems.

The TOPAS software tool supports European Air Navigation Service Providers (ANSPs) to comply with the regulatory requirements by Jan. 2nd, 2020.

Surveillance systems implemented in TOPAS:

- SSAR
- SSR
- Mode S Radar
- MLAT
- 1090 Squitter
- ACAS/TCAS (= planned enhancement)

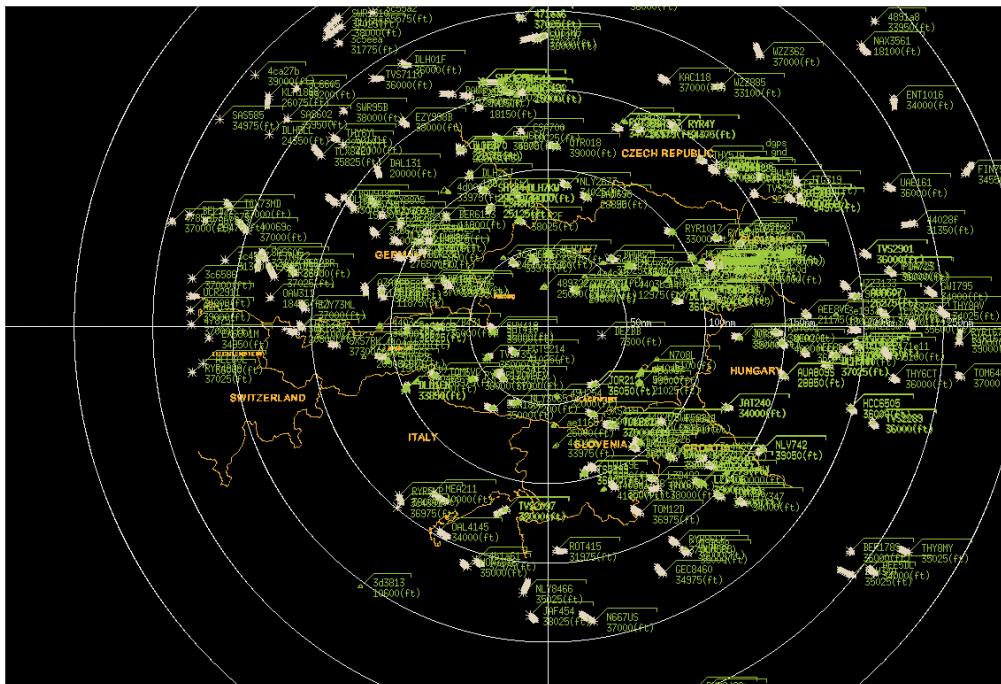
Austro Control offers:

- Frequency Impact Study for the airspace within your responsibility and your surveillance environment
- TOPAS for your airspace / your desired regions based on your real traffic situations
- Ex ante study and simulation on the impact of possible changes to the surveillance environment of the 1030/1090 MHz spectrum

Highlights - and your advantages:

- Support to fulfill the Implementing Rules 2017/386 and 1207/2011
- Real traffic scenarios can be used for transponder distribution
- For Mode S systems, the interrogation strategy can be configured
- Sidelobe interrogation is included (possible enhancement: base this on real antenna diagrams)
- Transponder reply probability
- The coverage diagrams of the sensors will be included, the occupancy can be calculated for different altitudes
- Early assessment on the impact of planned changes to the 1030/1090 MHz spectrum

**Results
available
in a few weeks
after order
- in time for
Jan. 2nd,
2020!**



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