

Low Earth Orbit Kinetic Space Safety Workshop

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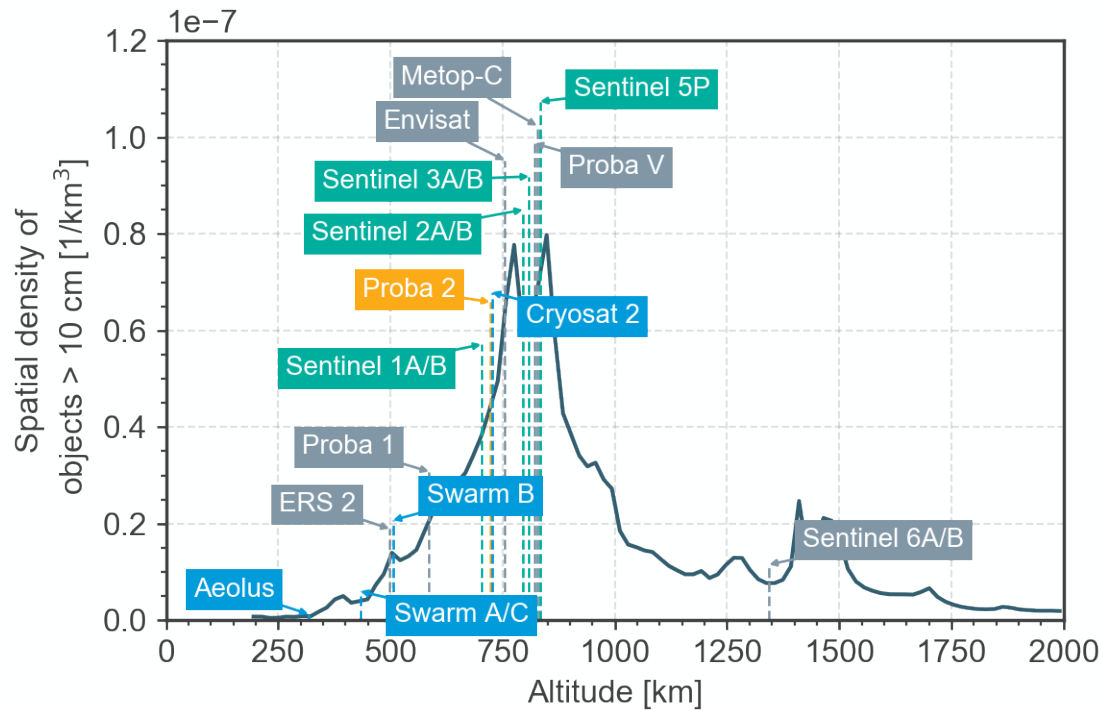
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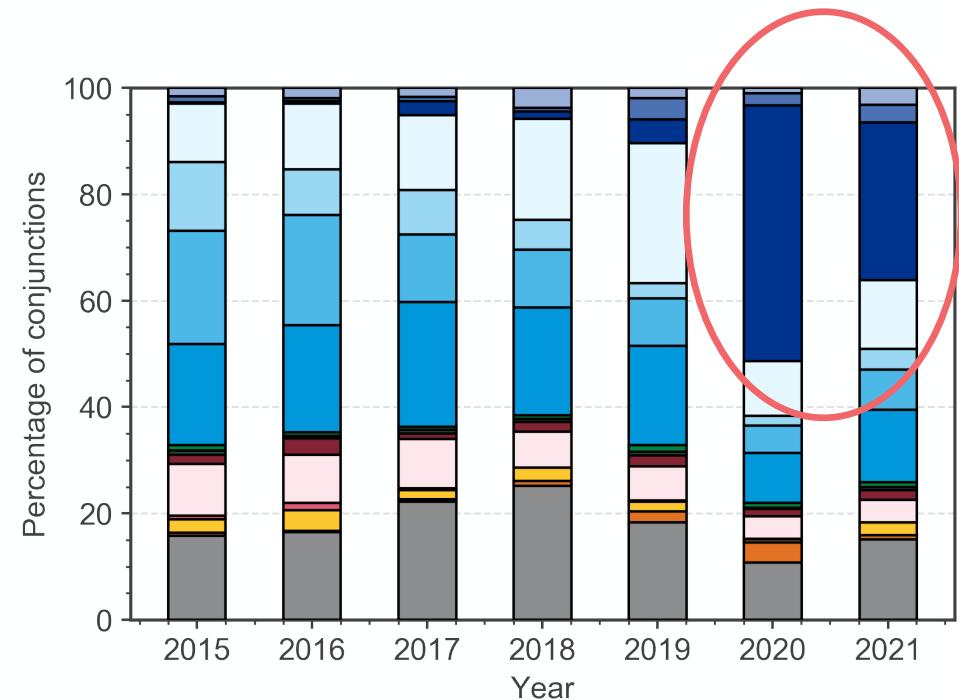
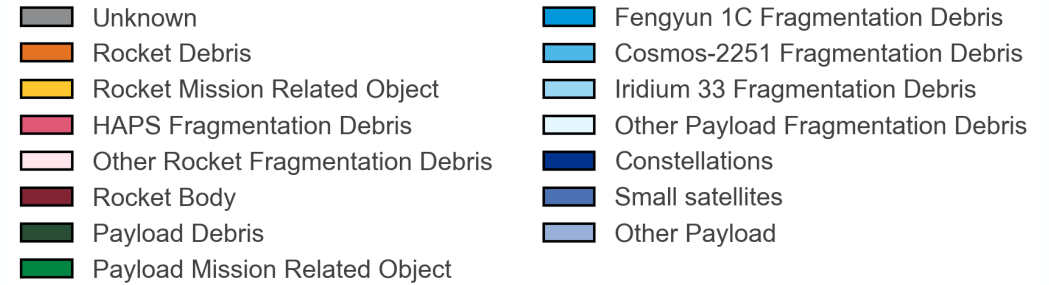
Avoidance Analytics Roundtable – Collision Avoidance at ESA / ESOC

Missions supported



- Earth Explorers
- Copernicus
- LEOPs and past missions
- Plus
- HEO, GEO

Overall statistics for conjunctions with collision probability above 10^{-6} : category of secondary object



- Constellations:
- altitude raise
 - autonomous decisions

Avoidance Analytics Roundtable – Future evolution

Trends

- **Larger** catalogue(s) (covering smaller object sizes)
 - More known high risk conjunction events and
 - More CAMs (unless criteria change)
- Further increase of launch traffic
 - More conjunctions **between active spacecraft - coordination** needs
 - Order of mag increase in specific altitudes
- **Multiple** catalogues
 - (Enlarged) US catalogue, other institutional and commercial
 - Not accessible to all operators
 - Data fusion needs
- **Need for increased automation and enhanced decision criteria**

Automation

Objective: reduce staff efforts (per conjunction event)

- **Reduce number of false alerts** (i.e. events triggering preparation of avoidance action involving human work)
- **Involve humans later** and shorter, i.e. shorten time between avoidance manoeuvre decision and time of close approach

Technology development within ESA's Space Safety Programme CREAM (Collision Risk Estimation and Automated Mitigation) cornerstone

- Automate collision avoidance **decision + design**
- **Late commanding** paths and operations concepts
- **Coordination** of operators and catalogue providers