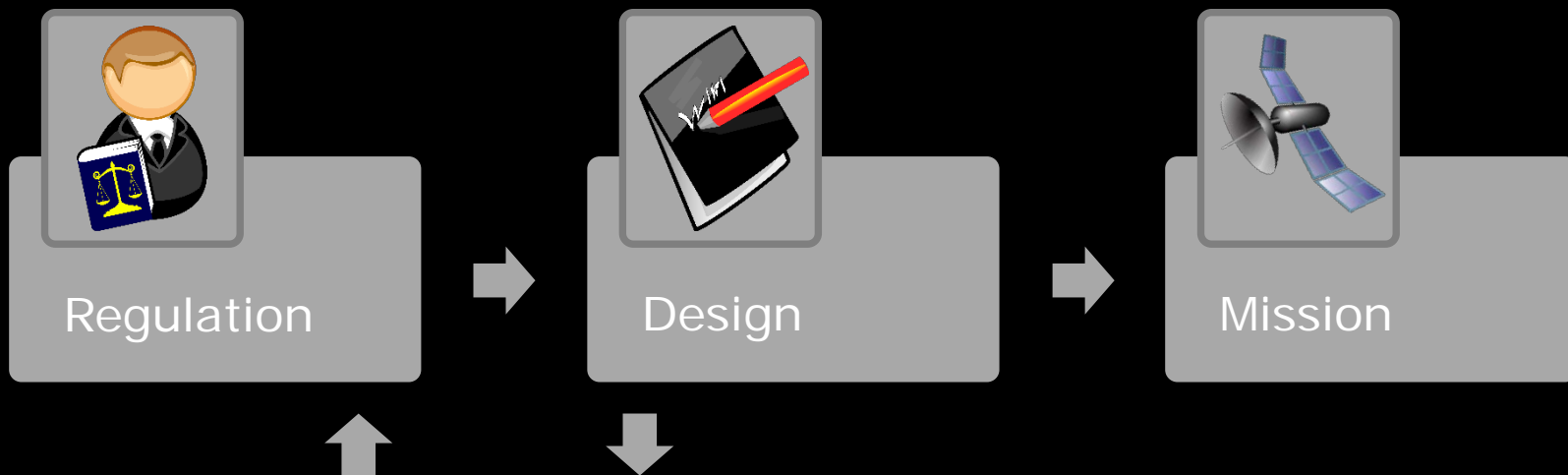


Debris-related subordinated ISO standards

Vitali Braun

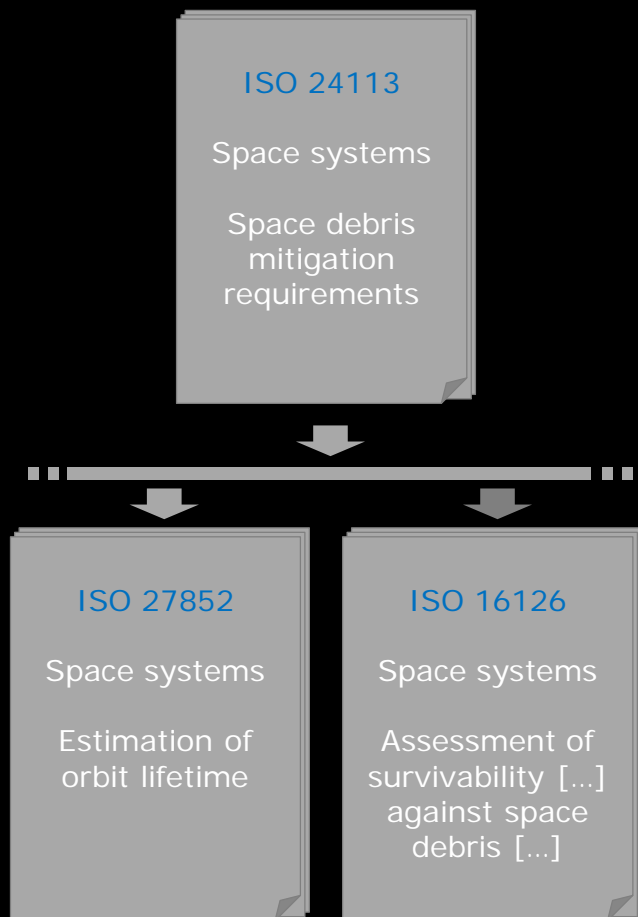
20/03/2019



Compliance verification

Top-level requirements

"[...] shall limit its post-mission presence in the LEO protected region to a maximum of 25 years from the end of mission."

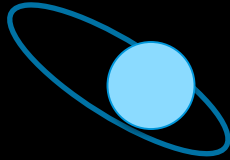


Methods and processes

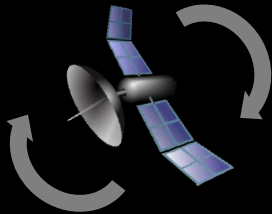
"[...] a numerical integrator with a detailed gravity model, third-body effects, solar radiation pressure, and a detailed spacecraft ballistic coefficient model."



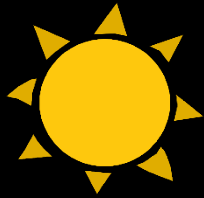
- Solar & geomagnetic activity forecast



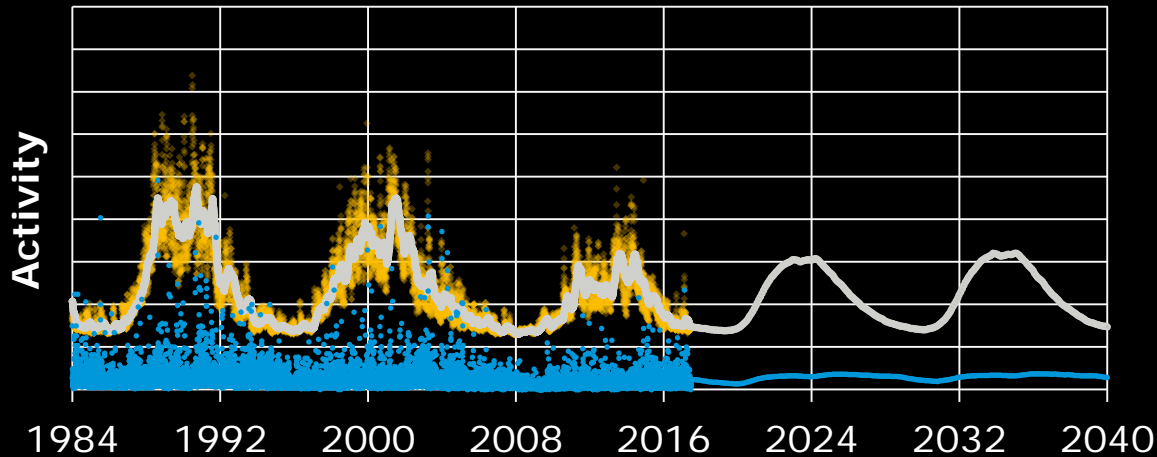
- Disposal orbit



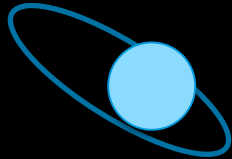
- Attitude motion



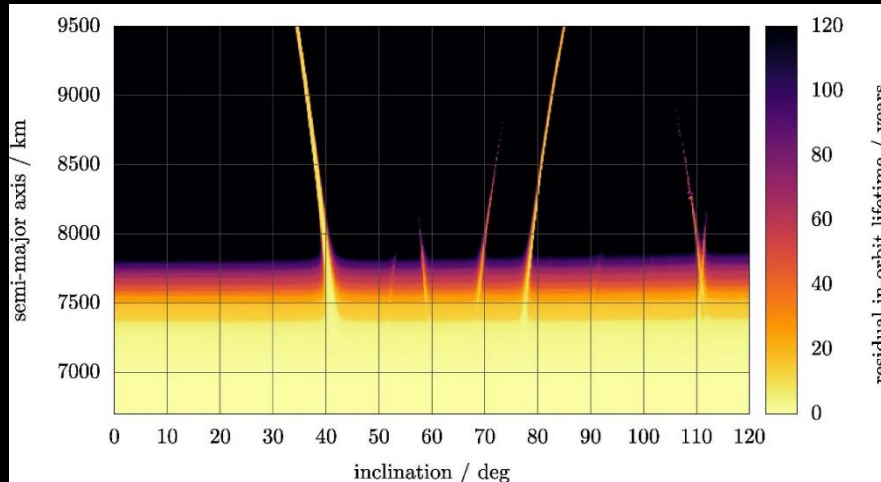
➤ Solar & geomagnetic activity forecast



- Forecast methods
- Launch year

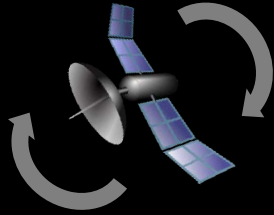


➤ Disposal orbit



(Schaus, 2019)

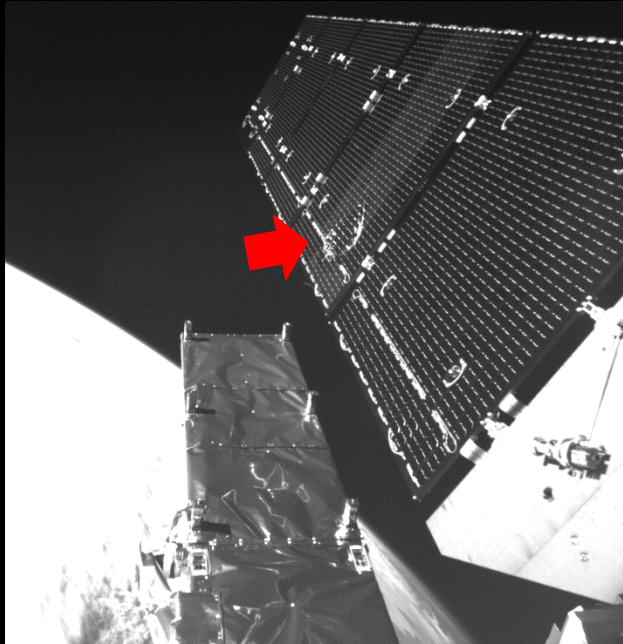
- ❑ Complex evolution
- ❑ Monte Carlo simulation



➤ Attitude motion

$$\textit{Lifetime} \sim \frac{\textit{Mass}}{\textit{Drag coefficient} \times \textit{Area}}$$

- Stabilisation modes
- Randomly tumbling



Objective: successful post-mission disposal

- ❑ Debris & meteoroid environment
- ❑ Mission concept
- ❑ Shielding & ballistic limits

Conclusion

- ❑ Compliance verification is complex
- ❑ Dedicated software
- ❑ Training



Thank you for your attention!

vitali.braun@esa.int