

## What will the civil and military space look like in 2050?

## What will be the consequences on the aerospace and defence industry?



What will people see in the sky four decades from now? How will the civil and military airplanes and spacecraft of 2050 look? My text takes a broad technological approach. I have tried to extract the fundamental trends from the present and the recent past, and extrapolate them four decades out. It is crucial to keep in mind the circumstances, the big picture. The world, with its bubbles and its crashes, its war and its peace, will decide which technology becomes important, which will turn out to be a commercial success.

To summarise my text, I would like to focus on five important evolutions.

1. What we've been seeing recently is the steep rise of **unmanned aerial vehicles**, especially in military service, both in surveillance and combat tasks. By 2050, efficient and autonomous UAVs of all shapes and sizes will be the majority of military air hardware.
2. These autonomous air vehicles are part of a paradigm change towards high-precision, network-centric warfare, in which controlling space and cyberspace become crucial. Protection of military satellites will be of vital importance. The **militarisation of Earth orbit**, although controversial, will be impossible to stop. Still, it is geopolitics, international conflicts between now and 2050, that will decide how far this will go.
3. Autonomy, 'fly-by-wire', already has a big impact on the civil aviation market. With ever more advanced systems, flying will become easier and safer, perhaps even allowing every family to own a '**personal**' airplane for shorter distances. In order for that to happen, however, major issues would need to be solved, like air traffic control and runway availability.
4. As for civil aviation, the other major trend is **energy efficiency**, the topic of last year's Student Award. A world with peaking fossil fuel prices will present a major challenge. At some point, incremental improvements in efficiency will no longer be sufficient and new airplane configurations and other innovations will be called for.
5. In civilian spaceflight, recent years have seen the first small steps of a major paradigm shift, in which **private industry will take over the transportation aspect of space**. Space agencies will be paying per kilogram or per seat, and their focus will shift to exploration, science and technology. Step by step, an international space infrastructure will be built, including for example space traffic control and asteroid monitoring. As of today, it is an open question when this will happen and how fast it will go. More certain is that in space, the big aerospace firms of today will have a hard time keeping up with smaller, more flexible and innovative newcomers.

With ever-smarter UAVs, advanced fly-by-wire technology, energy efficient transportation and Earth orbit bustling with both military and commercial activities, the aerospace world of 2050 will be very different from the one of 2009. Different, but promising.

