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SPACE SYSTEMS SYMPOSIUM (D1)
Innovative and Visionary Space Systems Concepts (1)

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NEW TECHNOLOGICAL AND SOCIETAL TRENDS AND THEIR CONSEQUENCES ON
INNOVATION IN SPACE SYSTEMS

Abstract

How can one innovate in space where the high TRL is the golden rule for operational missions? Space industry faces two apparently contradictory challenges.

Innovation is a second nature in space activities, with at least three explanations of this genetic heritage: a great deal of challenges in science and space exploration, the intrinsic difficulty of problems (access to space, constraints of the space environment, reliability and life duration, performance, autonomy, etc.) and the relatively small size of recurrent production, even in the case of constellations.

Nevertheless, customers and programme managers are always very reluctant to include new technologies or components in operational or critical missions: Technology Readiness Level is a very strict selection criterion and reaching TRL 9 is always a long run.

In a context of harsh international competition and emergence of new players, pressure on institutional budgets and need to find new growth opportunities, prime contractors and large companies shall be very selective in their technological choices and implement efficient and responsive methods for RT and innovation management.

This paper describes new tools used by Airbus Defence and Space to manage its RT and innovation policy and support the decision-making process. The monitoring of mid- and long term trends, related to technology but also to societal challenges, is a new experience started as part of innovation and RT management. Focused on technology, the first part of the paper reviews some examples from the portfolio of trends (with examples such as new access to space, miniaturisation, frequency management, fractionated payloads, energy production and storage, new orbits, etc.) with three dimensions: facts and figures, possible impacts on space systems and architectures, credible scenarios for the future.

With the innovation in business and governance models, this trend assessment seems to be a very useful tool supporting the investment decisions in RT but also the strategic evaluation of the competition or the likelihood of disruptive scenarios. The “out of the box” dimension is very helpful to assess potential “spin-in” technologies coming from domains where the investment capacity is sometimes much higher than in space.

In some cases, this approach can help to trigger a new type of relationship with the customers or the supply-chain and enables new designs based on co-innovation.

The last part of the paper provides some lessons learnt from recent creativity sessions and concrete examples of advanced concepts of space missions, systems and subsystems derived from these innovative methods.