

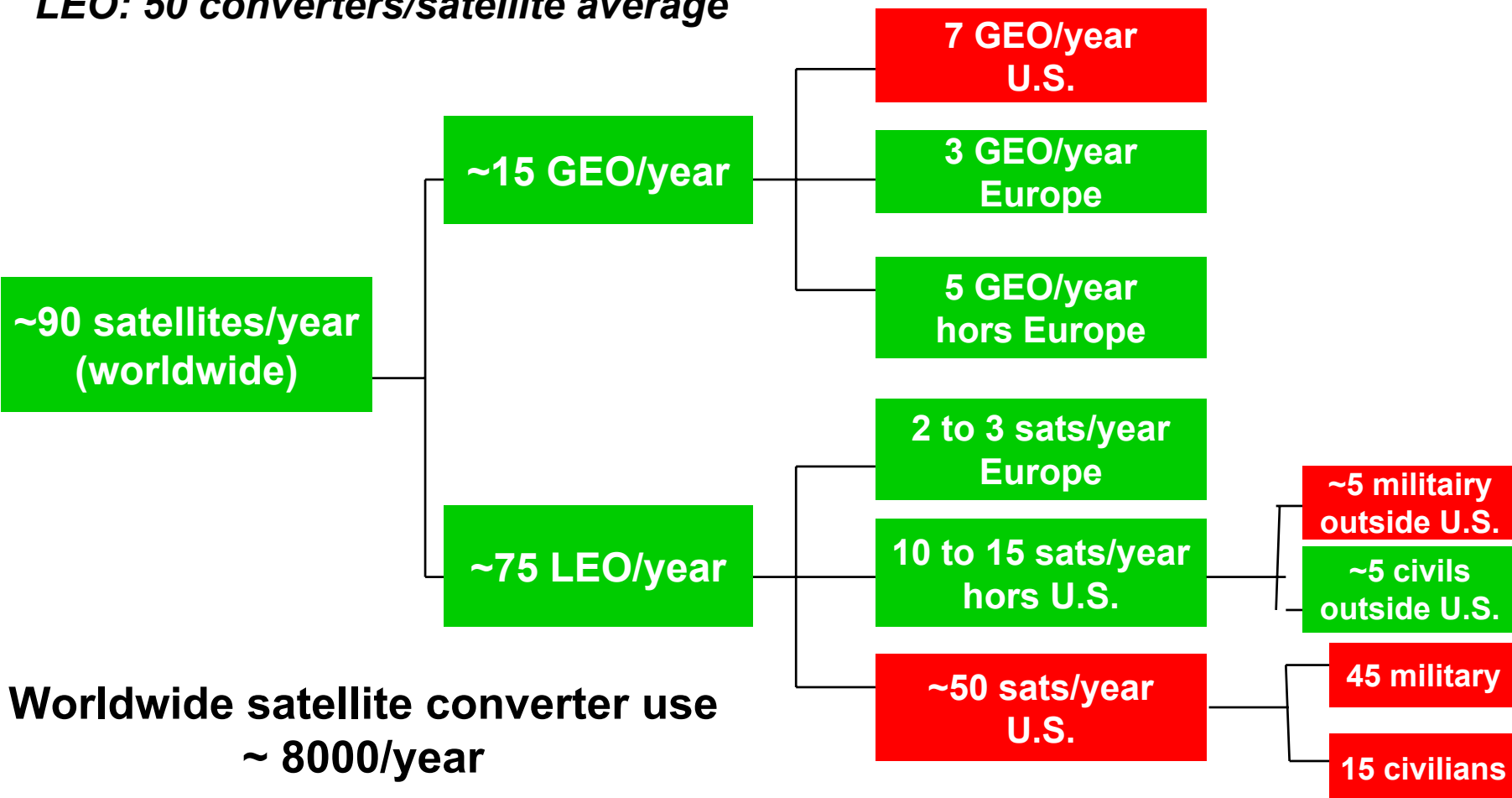
## Introduction

- Due to the short time notice, Eurospace has not had materially the time to consult widely with all concerned members.
- However the Members active at the Eurospace EEE Panel have been consulted.
- This short presentation gives the consolidated Eurospace view. Eurospace members will give their own specific presentation, including capabilities, during the day.
- This consolidated position could be further improved after the discussion today.
- For us EPCs for TWTAs are excluded.

# Estimation of DC/DC Converter Utilization in Satellites Worldwide

**GEO: 90 converters/satellite average**

**LEO: 50 converters/satellite average**



- DC/DC converters are ubiquitous in a satellite and there are many different types depending on the type of equipment (Digital, RF,...), mission profile (Telecom, Scientific,...), type of satellite (micro, mini, large), radiation level, etc. **Therefore there is no single solution for all needs.**
- For all types, the main requirements for Industry, both for users and manufacturers, are:
  - **Cost reduction.**
  - **Elimination of the dependence on components subjected to export licence.**

## Range of Specs covering 90% of all needs

- Input voltage: 20V to 125 V
- Output power: 5W to 300W
- Number of output voltages: 2 to 10
- No standardised output voltages
- Accuracy and ripple depending on the application.  
Basically two types:
  - High end:  $\pm 1\%$  accuracy and  $1\text{mV}_{\text{RMS}}$  ripple.
  - Medium :  $\pm 5\%$  accuracy and 1% ripple
- Platform dependent:
  - TM/TC interfaces
  - EMC

## Suppliers

- There are many different type of suppliers:
  - Internal “Make” by the equipment manufacturer.
  - European/Canadian space equipment manufacturers that sell DC/DC converters to other equipment manufacturers.
  - Specialist DC/DC manufacturers that have developed converters for the Space needs
  - Generalist DC/DC manufacturers with “high end” products that are used in some space programs
- Users typically make part or all of their needs and can buy from different sources.
- Large European primes are open minded about buying from external suppliers if price and quality are right.

## Needs

- Eurospace supports the ESA identified need for a low cost, general purpose, off-the-shelf family of converters; and, to make sure Industry will use them, we should jointly define the requirements, including cost targets.
- In addition there are some additional needs in Europe that are not well covered today and for which urgent action is required:
  - Low output voltage (1.8 to 3.3V) converters with  $I_{out} \leq 10A$  and high  $di/dt$
  - Advanced power and signal components
  - Advanced packaging techniques including mechanical and thermal design