

# **From autonomy to competition and cooperation: Potential leitmotifs for human machine assistance and automation**

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**Abstract:** This contribution for Prof. Inagaki's celebration looks beyond today's hype of autonomous driving to general roles and leitmotifs for the relationship between humans and machines, applied to cars and trucks. Starting point is a look back into the history of the homo species, especially on the role of autonomy, competition and cooperation. With a "fast forward" from ancient times to 1970, 80ties until today, the development of assistant and automation systems will be sketched, with examples from aviation and automotive, especially from Japan and Germany. Advantages and disadvantages of autonomy, competition and cooperation will be discussed, the double and triple binds of ability, authority, control and responsibility described, and the concept of unsafe valleys of automation introduced. A combined leitmotiv for future human machine system will be sketched: Autonomy for Cooperation, i.e. using autonomy for cooperation in cooperative systems to successfully compete against un-cooperative systems. As an example, the concept of cooperative guidance and control will be discussed, and linked to concepts like shared control and highly automated vehicles. Finally, potential future directions of our relationship with automated machines will be discussed with automated driving as an example.