

OLIVIER de Weck: About five years ago, we started thinking about our classes in the area of aircraft systems and spacecraft systems in the department. And we started realizing that there was a particular class that we didn't have, and something that seemed very important to us, and also very important to people in industry. And that is a general introduction to systems engineering.

Systems engineering is essentially the art and science of coordinating and putting together the different disciplines in order to create safe, efficient flying systems-- not just flying systems, but systems in general. And so we decided to create a six-unit class, which is a half class, that would focus on the methodology and the processes in systems engineering, which is going all the way from stakeholder needs and expectations, all the way to a functioning system that can be deployed in the field. This class, 16842, is really a door-opener to the world of systems engineering. And what we use in the class to orient everybody is the classic V-model of systems engineering.

Now what is the V-model? The V-model takes you step-by-step through the life cycle of a system, starting with the left side of the V, which is, why should the system exist in the first place? Who are the stakeholders? What are their expectations? How do you formulate a concept of operations for a system?

And then go step-by-step through the V, through the requirements definition, concept generation and selection, driving the system design, all the way to the details, to every little part, and piece, and component, and then moving up the right side of the V, where you integrate all these pieces into subsystems and modules. You do verification, validation, testing. You commission the system and bring it into operations. And even then, the job isn't done. You have to accompany the system throughout its life cycle through maintenance, upgrades, repair, making sure the system is really operating as efficiently as it can.

So what the class does is take students systematically through every portion of the V, so that at the end of it, they have a good overview over, what is systems engineering? And what are the key steps in the life cycle of a system?