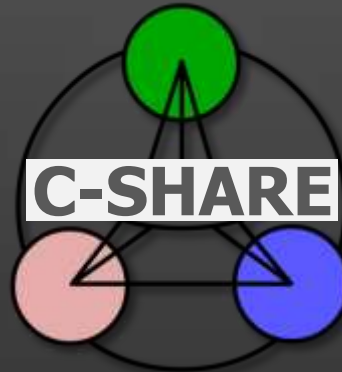




**Joint Human-Automation Cognition through a Shared
Representation of 4D Trajectory Management**
Second SESAR Innovation Days

Rolf Klomp

Project Consortium



Max Mulder (coordinator)
Rene van Paassen
Rolf Klomp

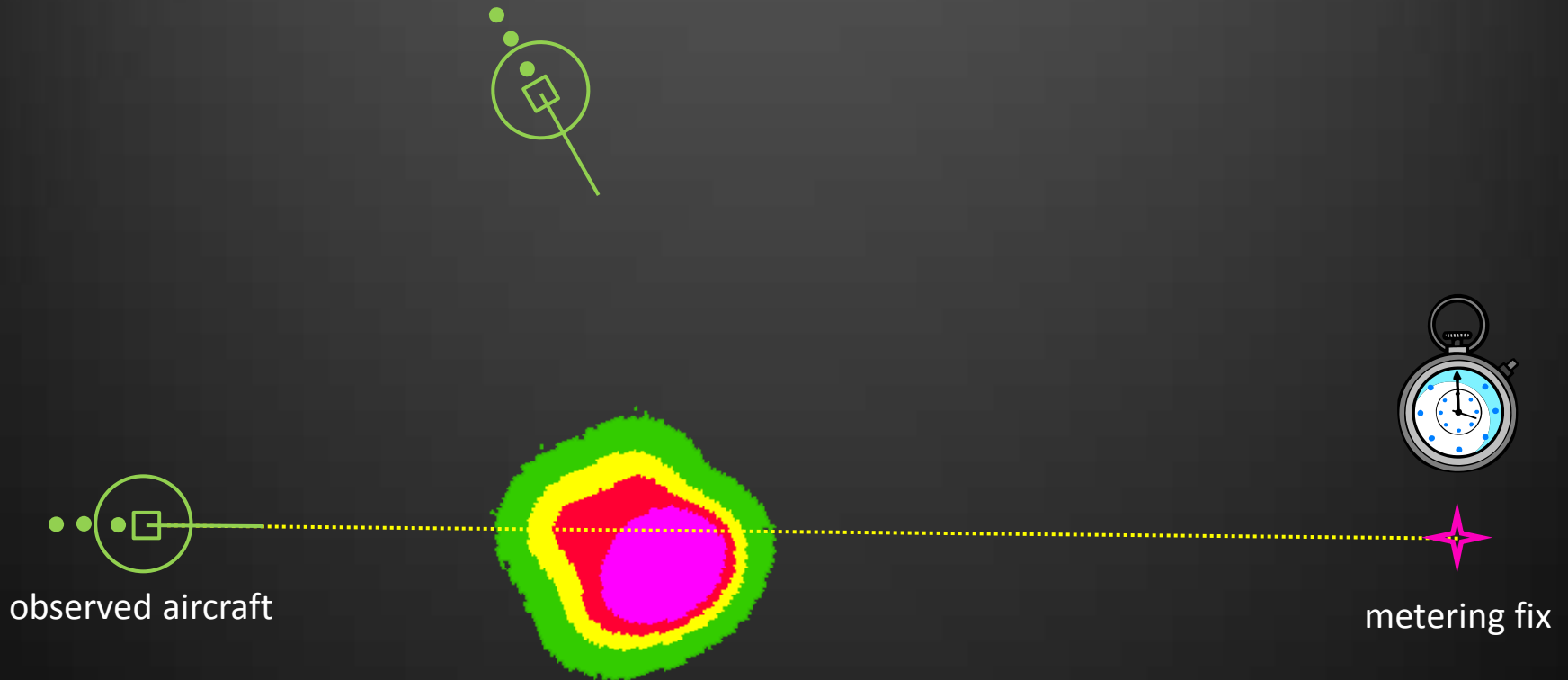


Martijn Mooij
Annemiek van Drunen
Sorin Iacob

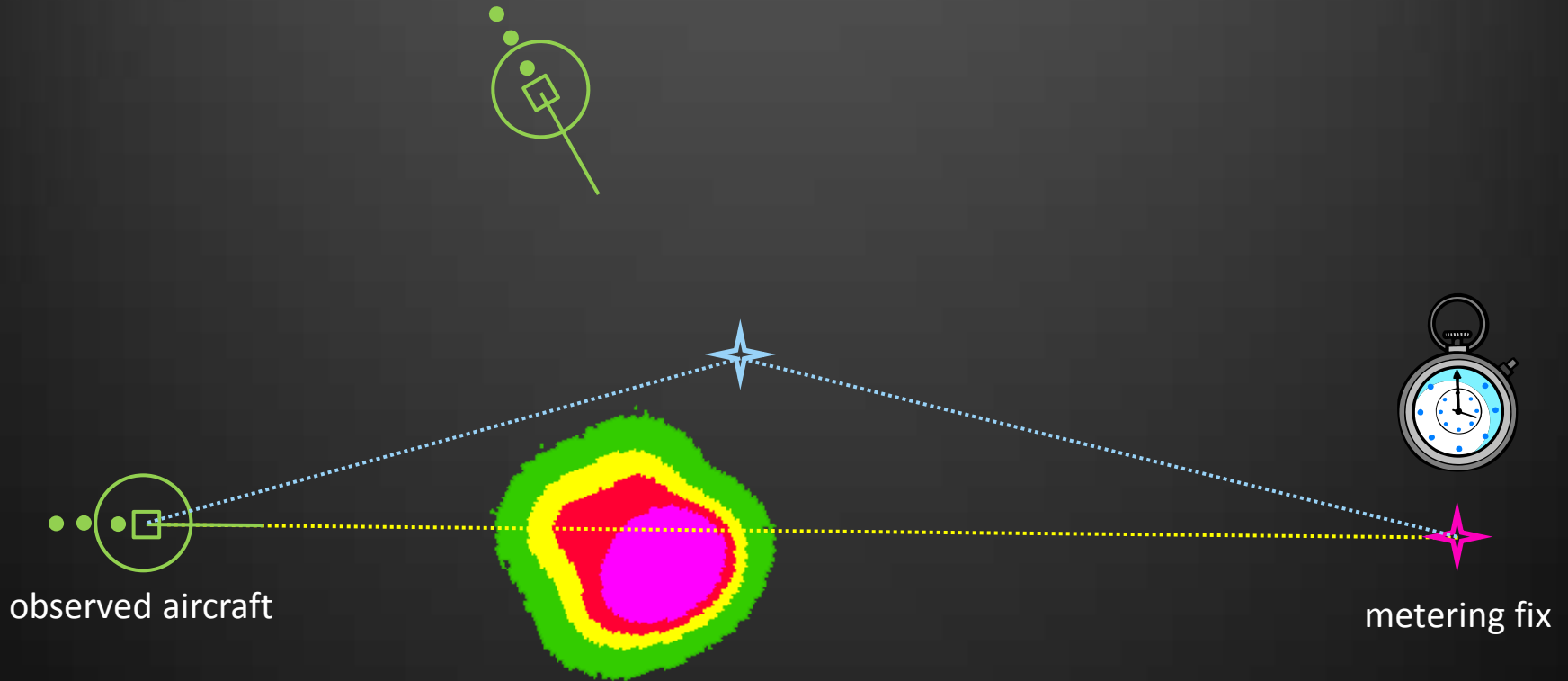


Pim van Leeuwen
Dennis Nieuwenhuisen
Tanja Bos

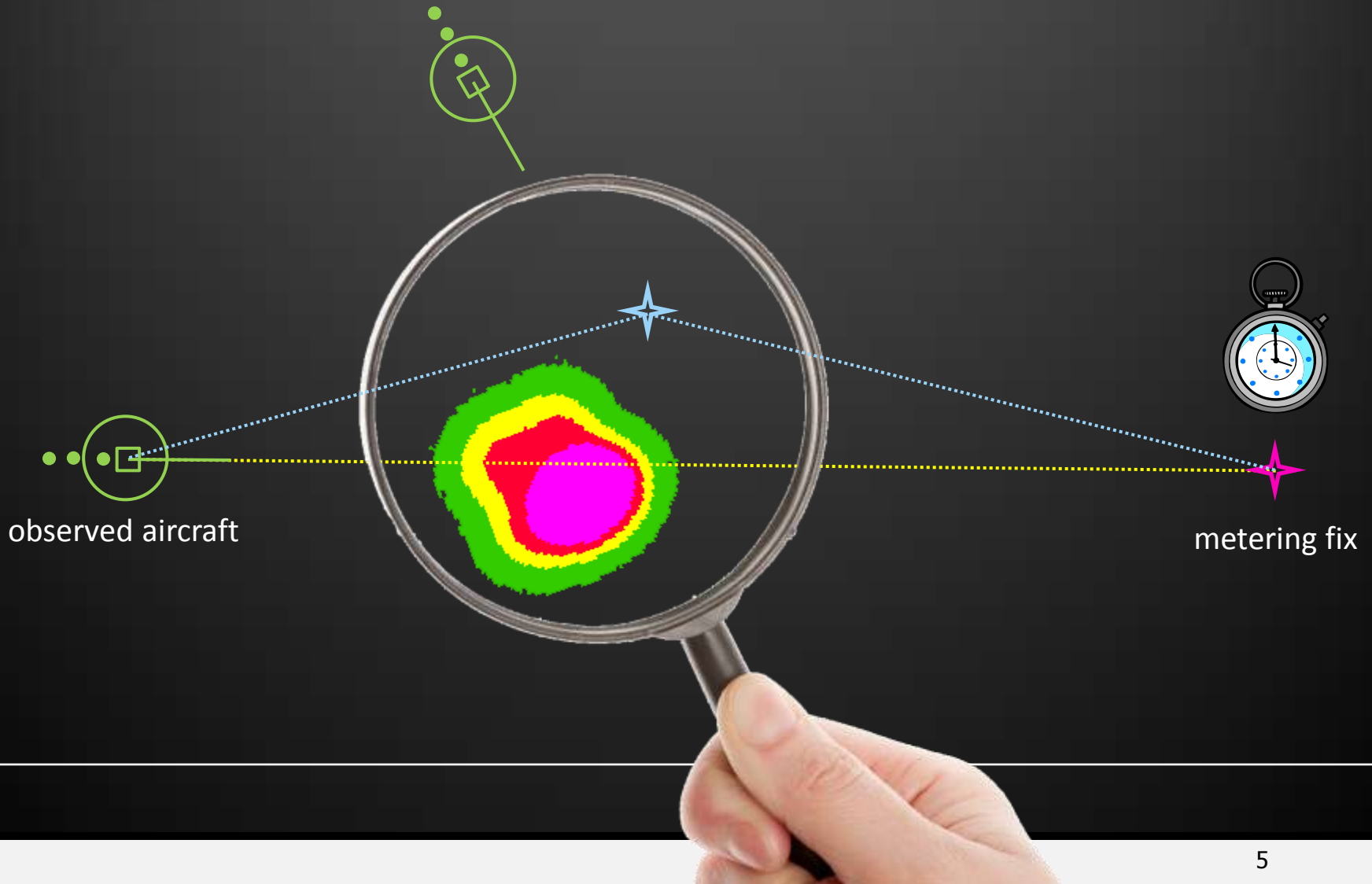
How can we effectively cope with complex situations in 4D trajectory planning?



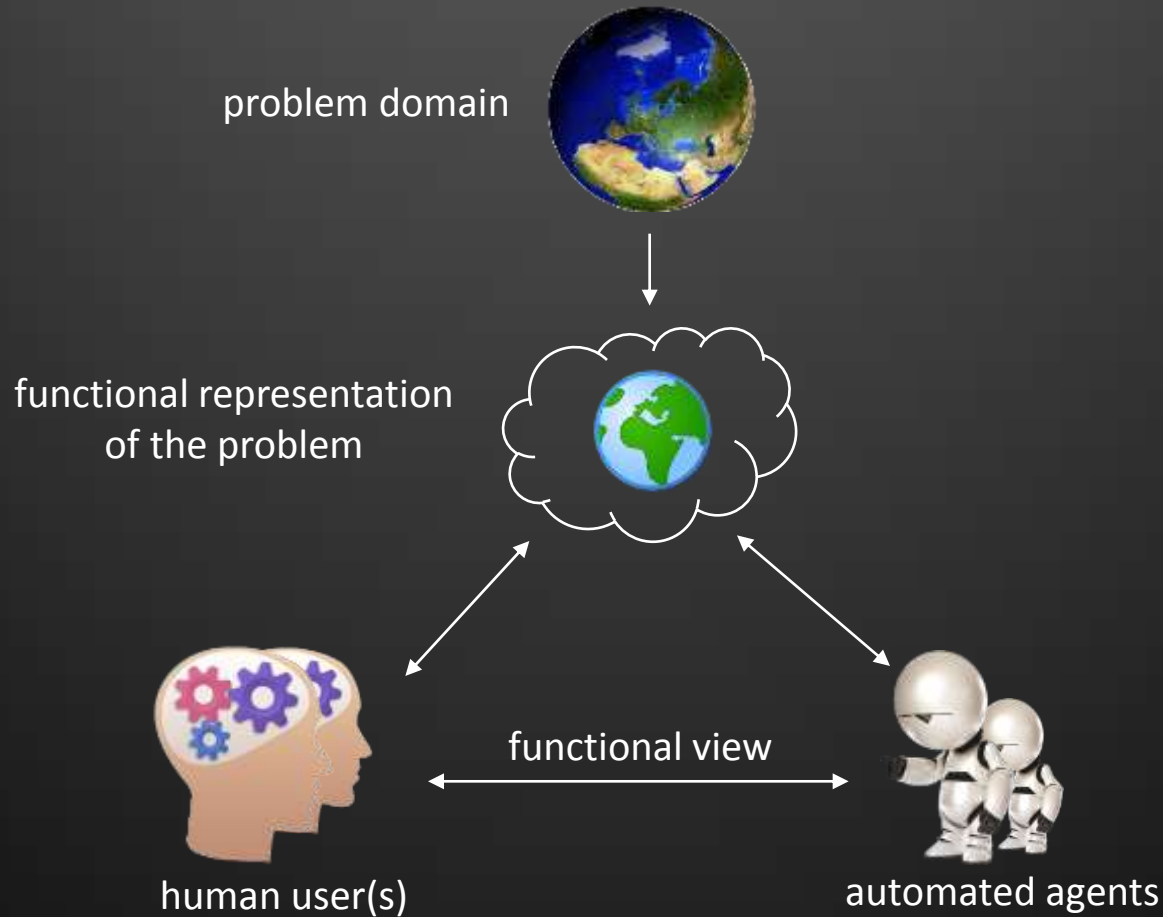
By taking a 'leap of faith' and always trusting automation?



C-SHARE aims to make automation more transparent



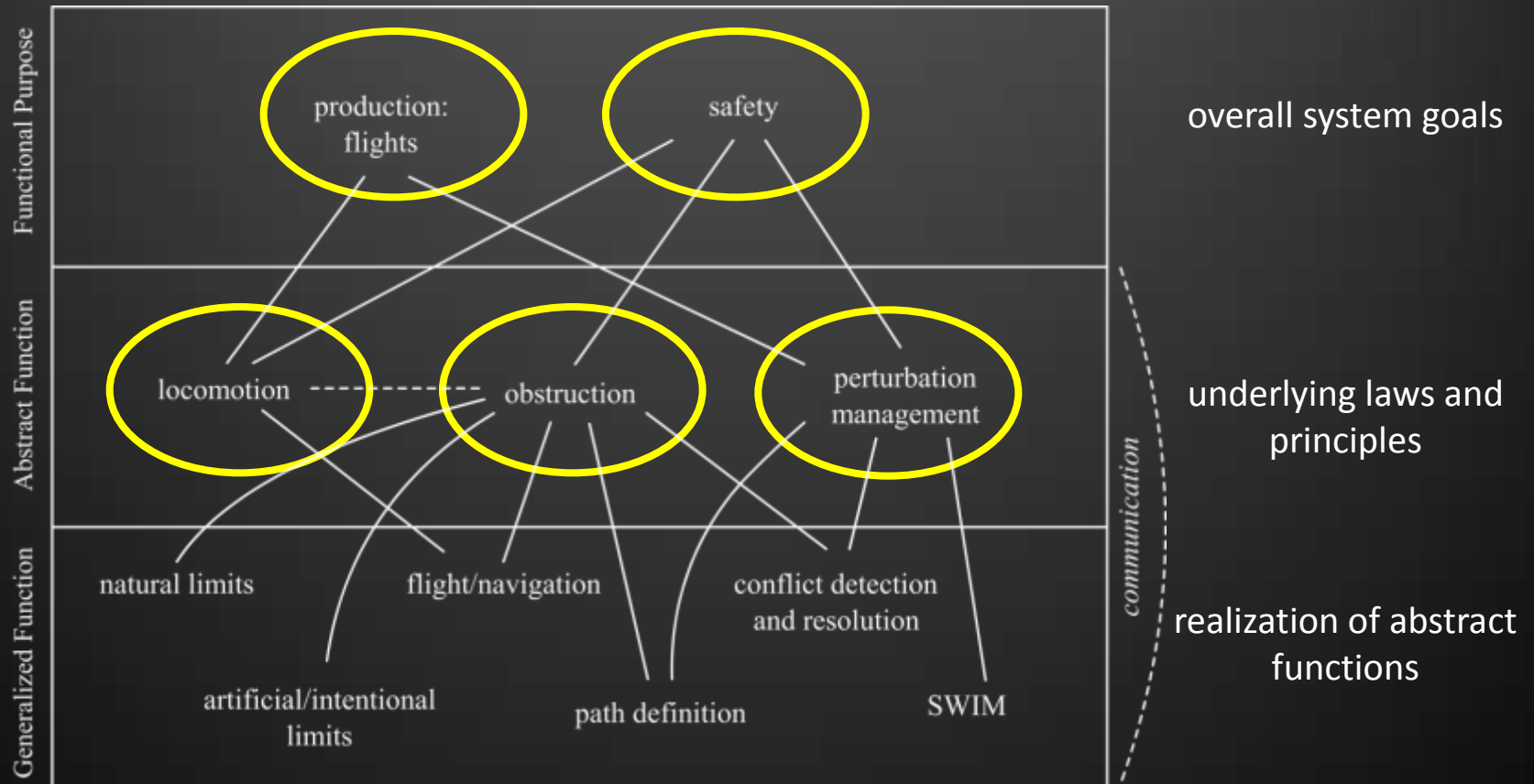
The foundation for effective human-machine coordination is based on a common ground of the problem to solve



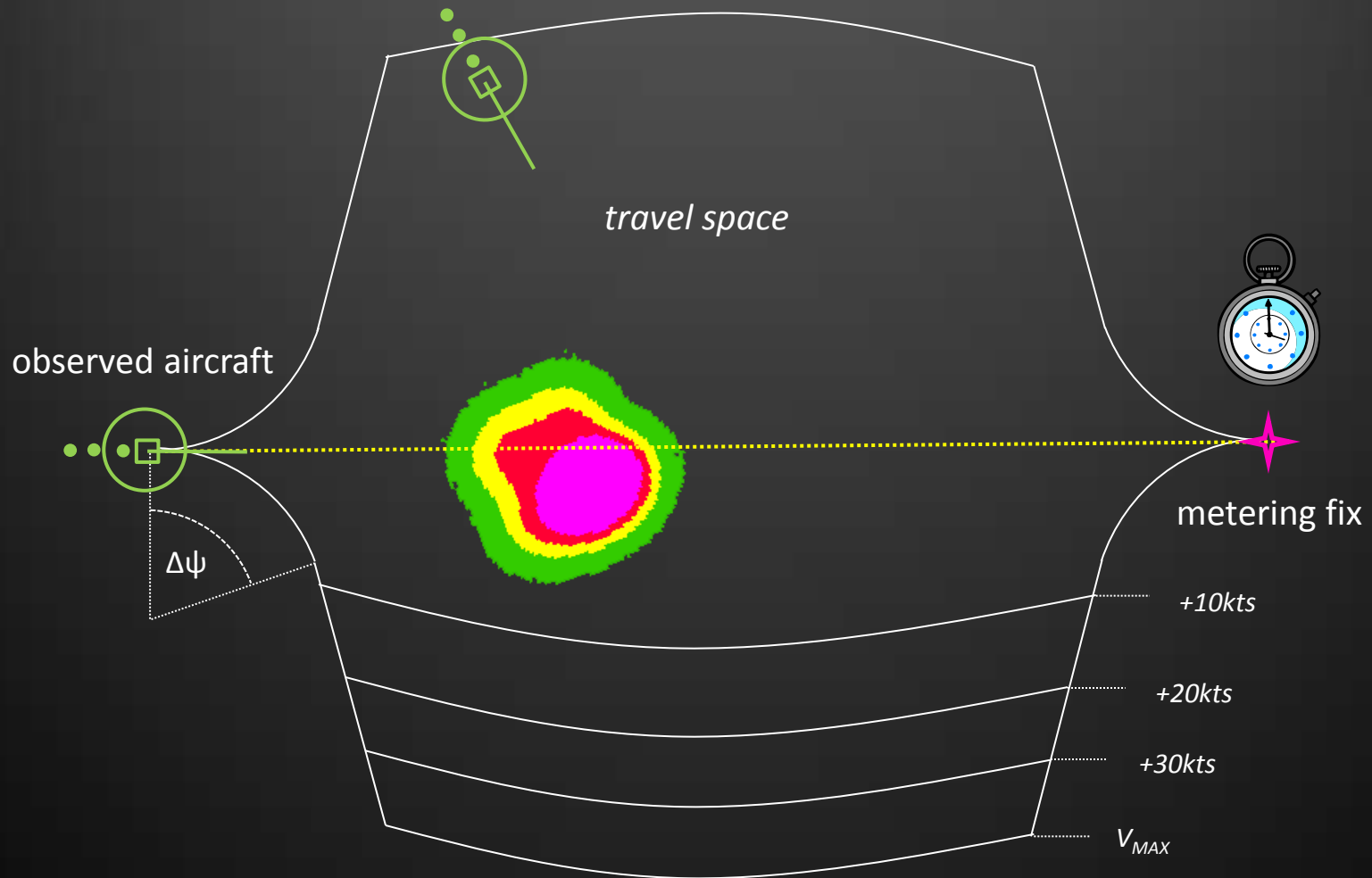
In C-SHARE we take the Cognitive Systems Engineering approach to analyse the problem domain

- Work Domain Analysis *What is the purpose of the system?*
- Control Task Analysis *What must be done?*
- Strategies Analysis *How can it be done?*
- Cooperation Analysis *How can work be shared?*
- Worker Competencies *How can operators best be supported?*

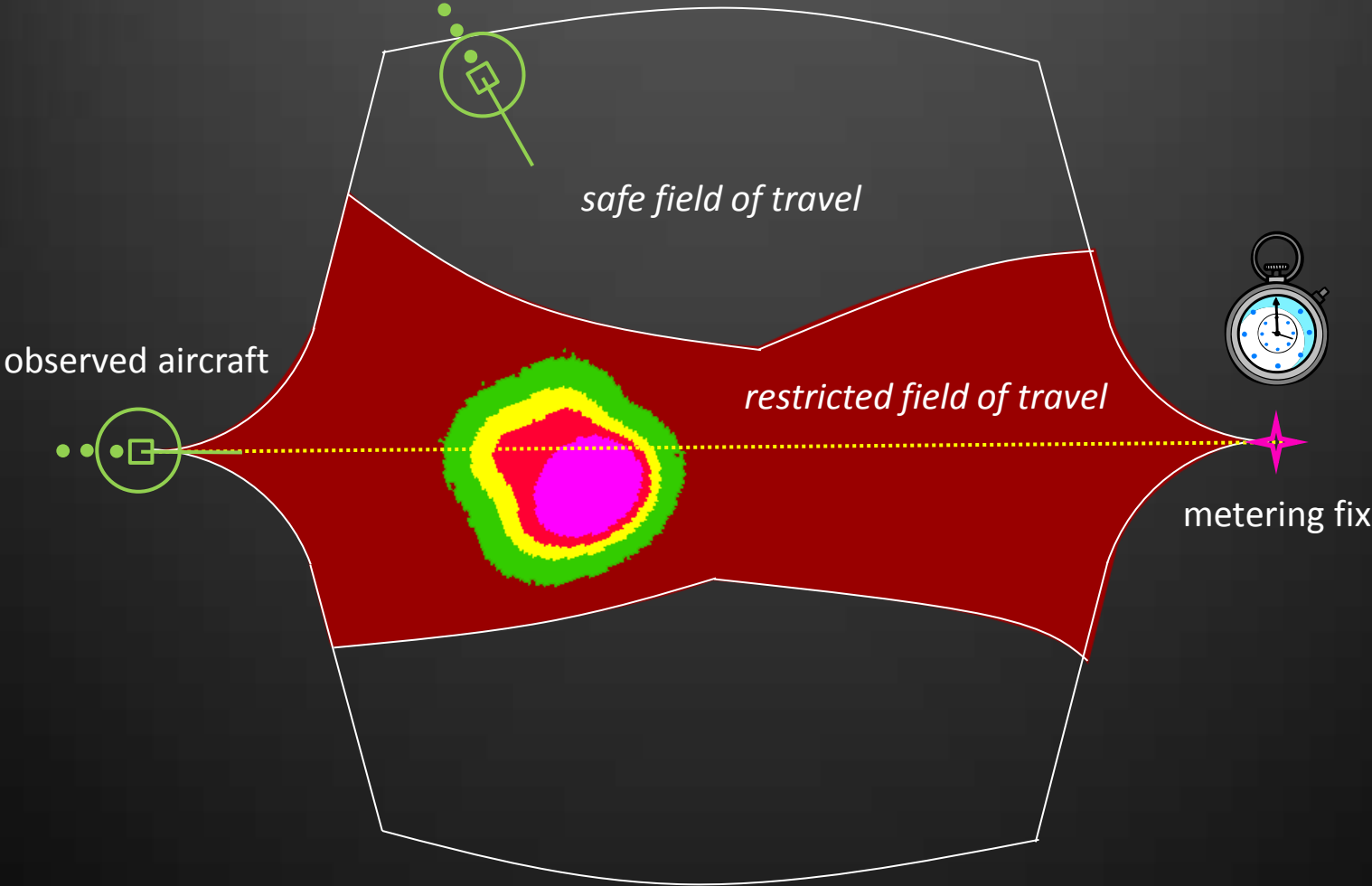
The Abstraction Hierarchy shows the opportunities, constraints and relationships of the problem domain



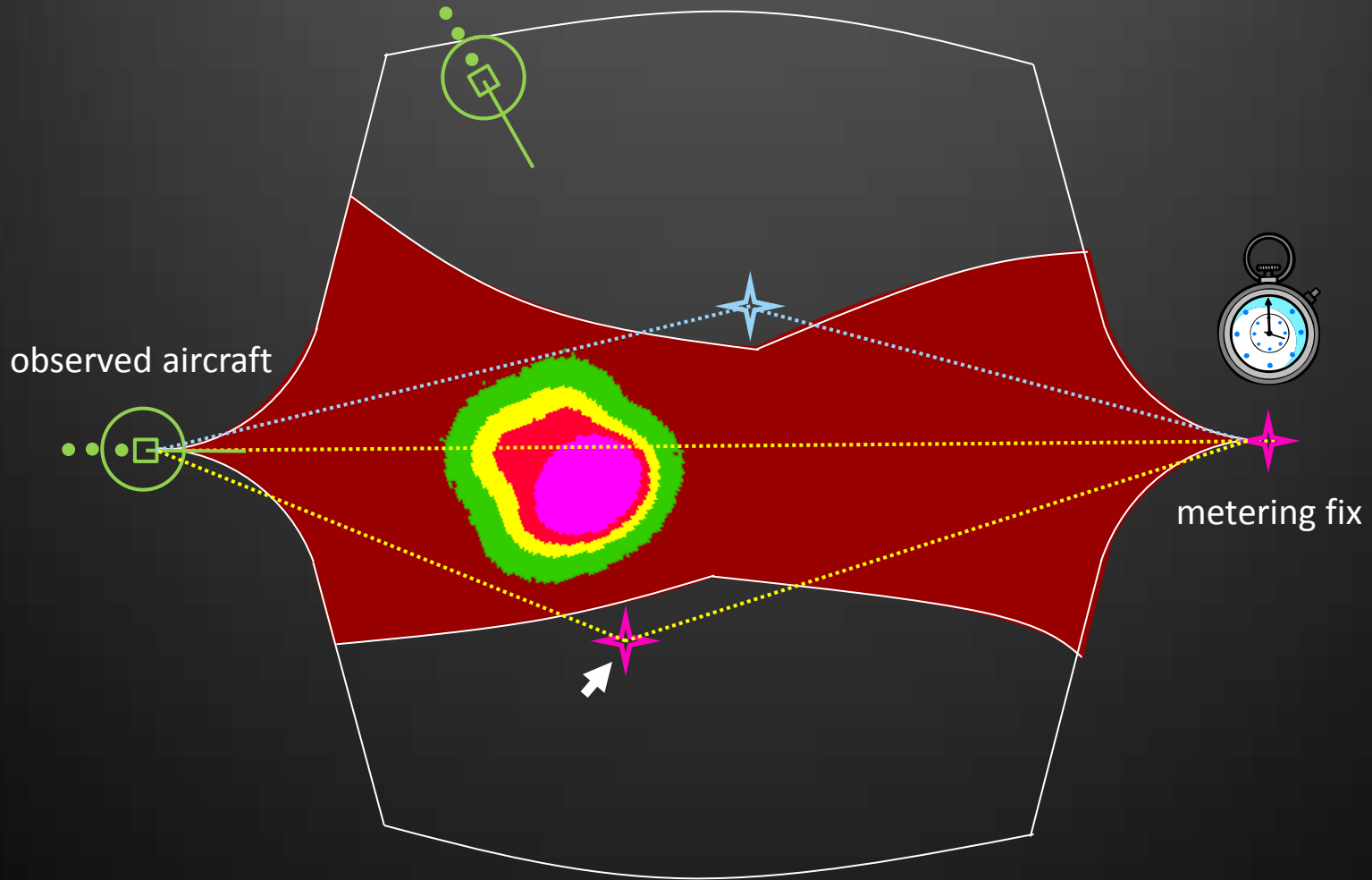
One-to-one mapping of the observed aircraft internal locomotion constraints



Visualizing the constraints which follow from dynamic obstruction



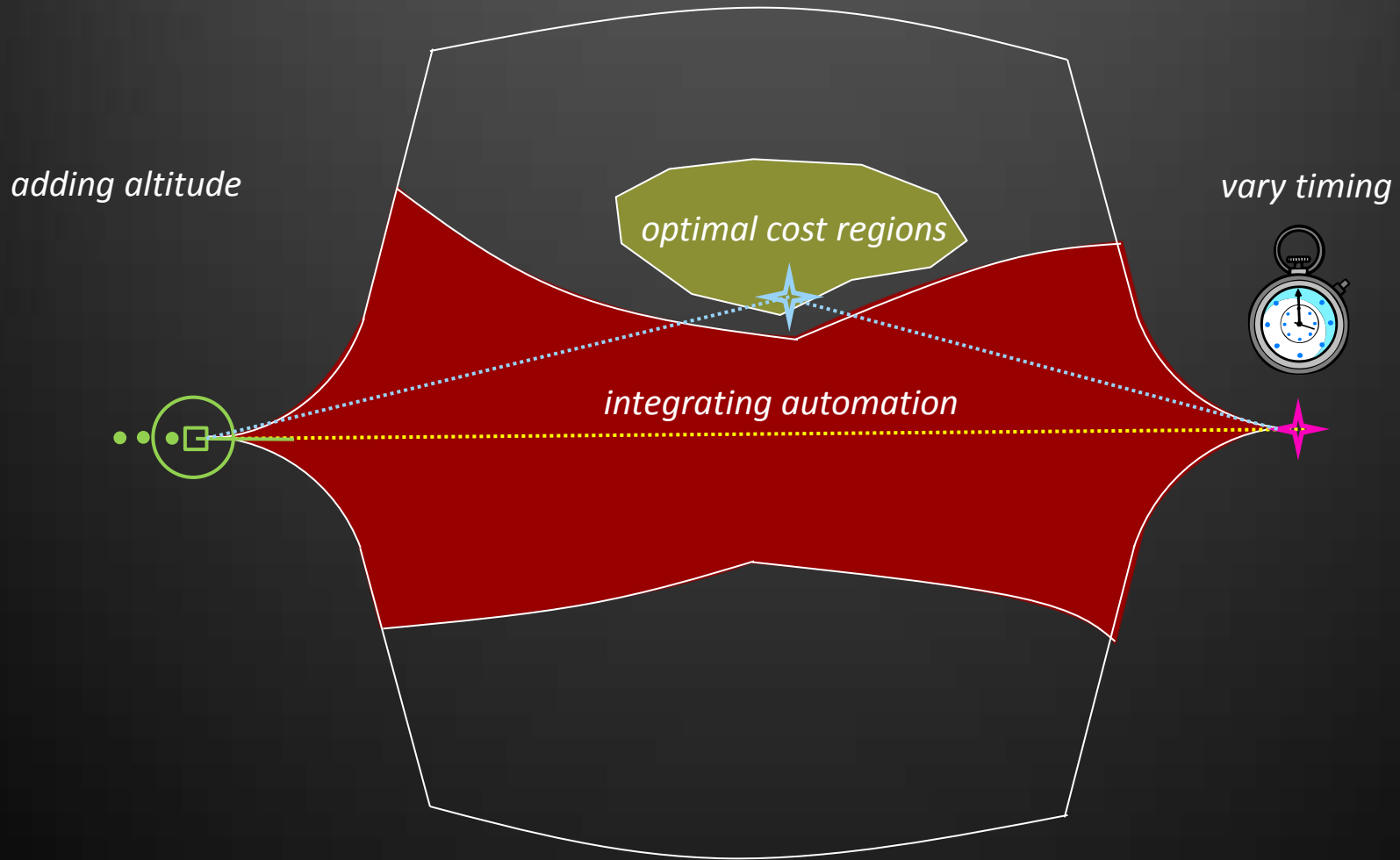
The travel space shows the constraints for problem solving rather than a single optimised solution



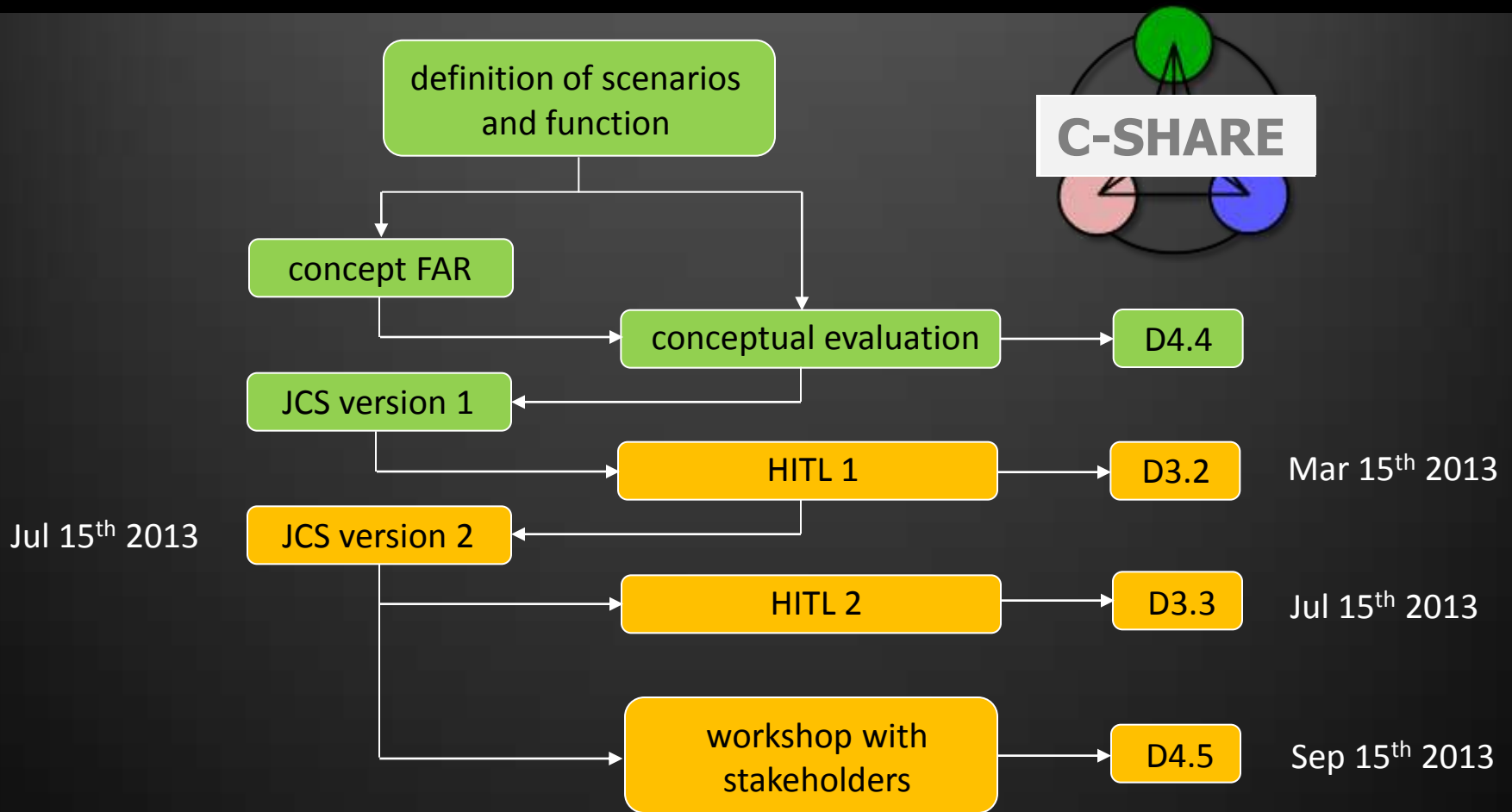
Demo of the software-based implementation of the Travel Space representation



The next steps for C-SHARE will focus mainly on scaling up the representation and achieving human-automation teamwork

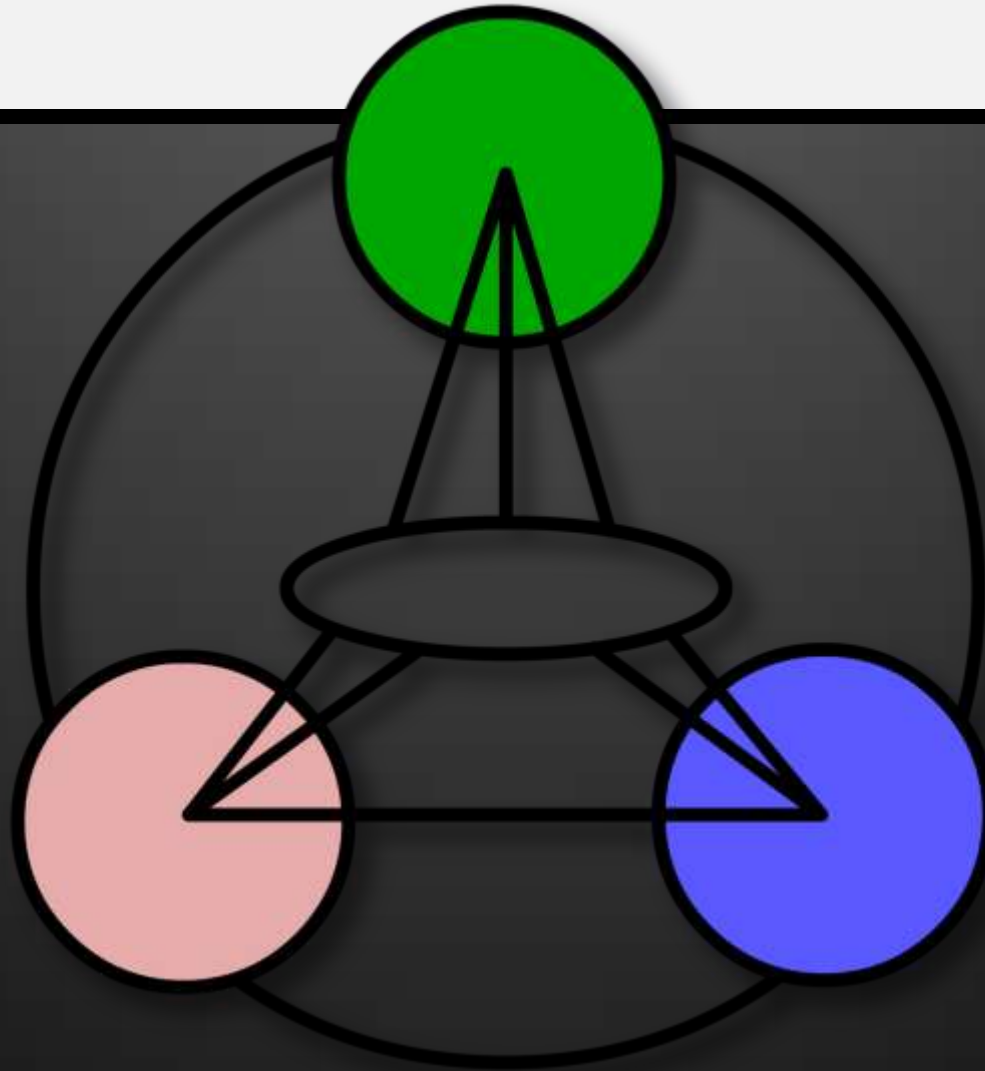


Upcoming activities



Project duration: March 2011 – November 2013

Questions?



Contact: R.E.Klomp@TUDelft.nl

A diagram on a dark grey background featuring three large circles: a green one at the top, a pink one at the bottom left, and a blue one at the bottom right. A large black arc connects the top and bottom circles. A horizontal line connects the centers of the pink and blue circles. From the center of the pink circle, a line goes up and right to the center of the green circle. From the center of the blue circle, a line goes up and left to the center of the green circle. A blue vertical bar is on the far left edge of the slide.

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The pitfalls of automation

- “Out-of-the-loop” situation awareness
- Vigilance problems
- Transient workload peaks
- Skill degradation
- Overreliance
- Lack of trust
- ...



Example displays using the ecological approach

