



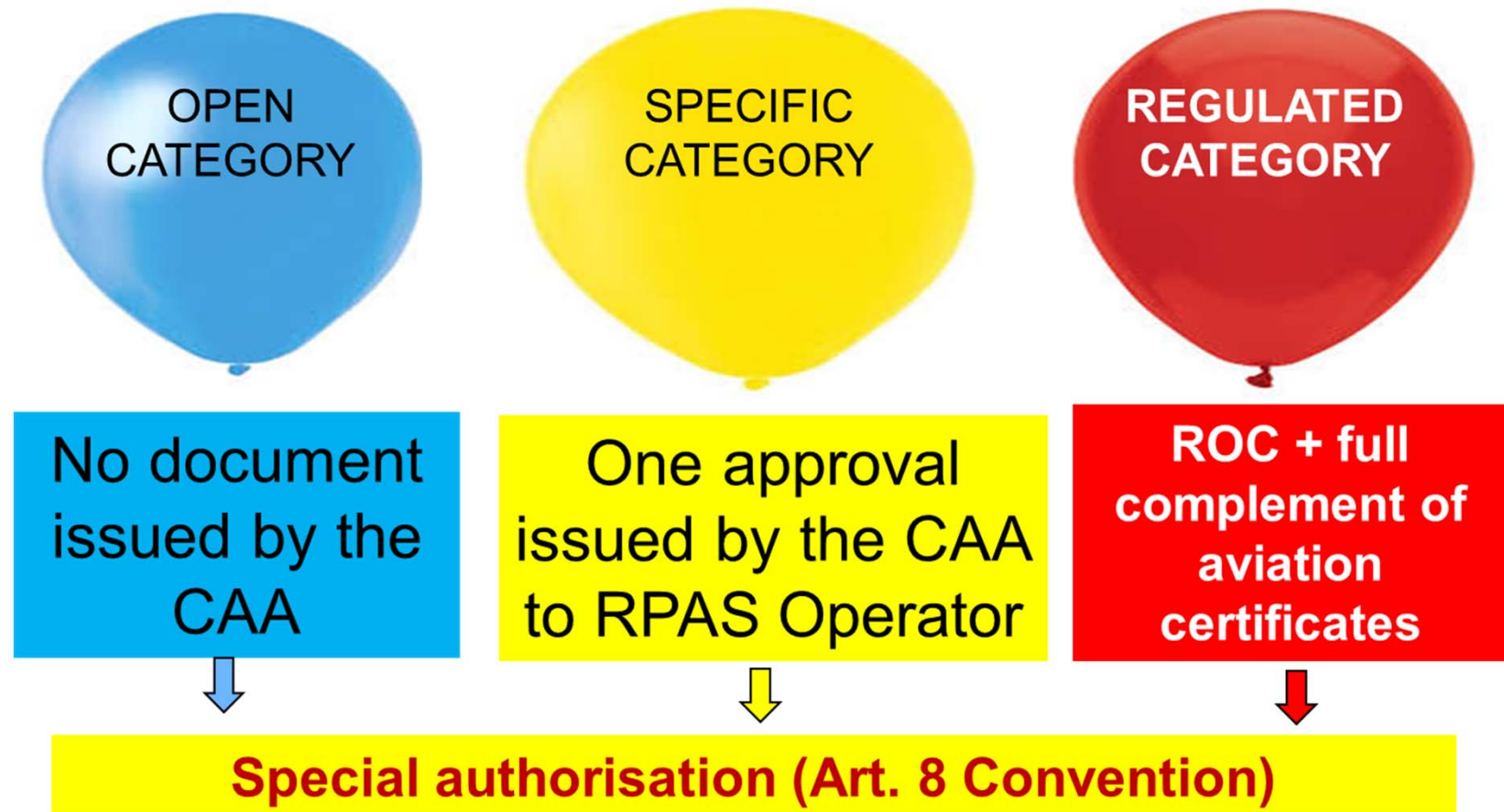
ASDA Research Tournament Round 1

SESAR Innovation Days, 1st -3rd December 2015

DEEP BLUE s

Before answering Q1: 3 Categories

- ▶ 3 “balloons” depending on the risk for society



Automation as solution

- ▶ Non nominal scenario – automation is the solution



Automation – Job changes & (new) tasks

- ▶ New tasks
- ▶ Migration
- ▶ Allocation
- ▶ “The New Division of Labor” : Richard Murnane and Frank Levy, ask two simple but profound questions:
 - » What do computers do better than people?
 - » What do people do better than computers?



Expert thinking vs Complex communication

- ▶ Computers are more accurate and faster than people at any task that can be expressed as a set of rules
- ▶ Humans are better than computers at anything that involves **pattern recognition** (e.g., looking around a restaurant and figuring out who needs service, or making a diagnosis from strange symptoms that do not fit into any existing protocol, like what Dr. Gregory House does on TV).



Complex communication

- ▶ Data and data analysis into meaningful and practical guidelines
 - » Resilience 2050 – WP-E projects (e.g. NINA) – FP7 projects (e.g. ACROSS)
- ▶ Support and look for collaborations with ATCOs, ATM operational experts (e.g. SCALES, 6th sense of ATCOs)
- ▶ New technologies as opportunities (*Alain Siebert*) in a GLOBAL single sky



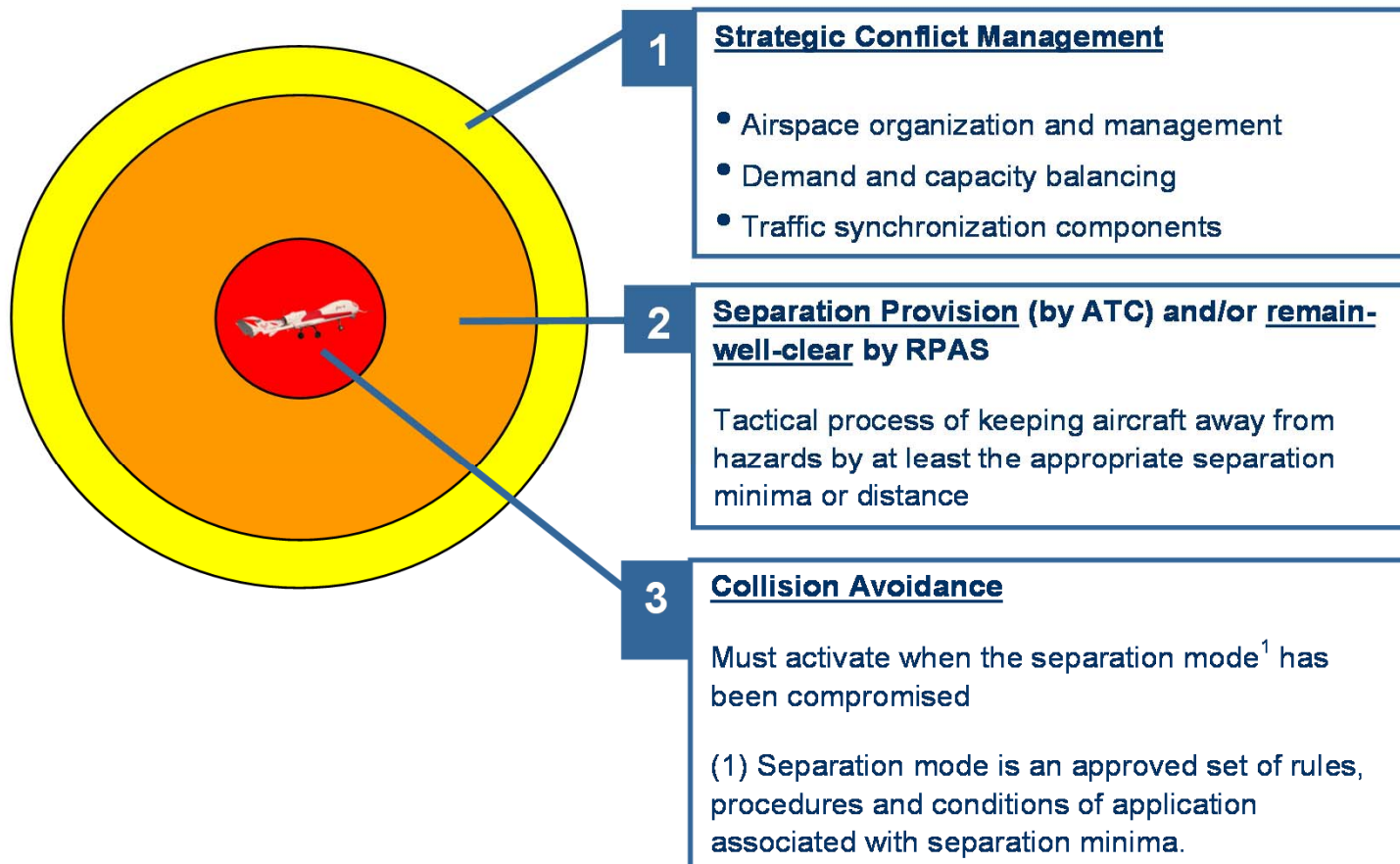
What is the challenge?

- ▶ Xavier Fron
 - » RPAS
 - » Spectrum
 - » Number of things flying...
 - » The challenge is for you!!!
- ▶ THE CHALLENGE IS FOR ALL OF US
 - » Dynamically and timely adapt to these changes
 - » Proactive and holistic approach



TOTAL SYSTEM APPROACH

► Detect and Avoid: three phases



Synergies

- ▶ Any input from complexity science on best strategies to segregate traffic flows?



Questions:

1. Who is responsible in case of a collision of an RPAS/UAV with e.g. an airliner?

- | | |
|------------------|---|
| A) Manufacturer | D. Air Traffic Controller |
| B) Remote Pilot | E. Authority who allowed RPAS into airspace |
| C) Airline pilot | F. That depends..... (on what?) |



2. Are RPAS/UAV more likely to collide/crash?

- And if so, why?
- How to solve it?





Complexity science and RPAS

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SESAR Innodays 2015



What we are doing today zooming out



Where we may go



The fifth element

A certain insights

Scale-free correlations in starling flocks

Andrea Cavagna^{a,b,1}, Alessio Cimorelli^b, Irene Giardina^{a,b,1}, Giorgio Parisi^{b,c,d,1}, Raffaele Santagati^b, Fabio Stefanini^{b,2}, and Massimiliano Viale^{a,b}

^aIstituto dei Sistemi Complessi, Consiglio Nazionale delle Ricerche, 00185 Rome, Italy; ^bDipartimento di Fisica, Università di Roma "La Sapienza", 00185 Rome

Context-dependent hierarchies in pigeons

Máté Nagy^{a,b,c}, Gábor Vásárhelyi^{b,c}, Benjamin Pettit^a, Isabella Roberts-Mariani^a, Tamás Vicsek^{b,c}, and Dora Biro^{a,1}

^aDepartment of Zoology, University of Oxford, Oxford OX1 3PS, United Kingdom; ^bDepartment of Biological Physics, Eötvös University, H-1117 Budapest, Hungary; and ^cStatistical and Biological Physics Research Group, Hungarian Academy of Sciences, H-1117 Budapest, Hungary

Edited by Raghavendra Gadagkar, Indian Institute of Science, Bangalore, India, and approved June 19, 2013 (received for review March 22, 2013)

Hierarchical organization is widespread in the societies of humans and other animals, both in social structure and in decision-making contexts. In the case of collective motion, the majority of case studies report that dominant individuals lead group movements, in agreement with the common conflation of the terms "dominance" and "leadership." From a theoretical perspective, if social relationships influence interactions during collective motion, then

are now the focus of both theoretical and empirical investigations (3, 14–19). Elucidating how social structure and individual differences affect group decision-making across a range of taxonomic groups will put the study of collective behavior into a broader biological context. Addressing these questions requires improved tracking technology and computational methods for quantifying interactions in large groups of identified individuals. These high-

Emerging properties: swarm learning/intelligence

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