Self-organizing mobile surveillance security
Duco Ferro & Alfonsi Salden, Almende B.V. Rotterdam, The Netherlands

**INTRODUCTION**

**Mobile Surveillance Security**
- Guards perform patrols
- Incidents require patrols to be coordinated:
  - Communication and collaboration
  - Decision making

**Problem**
- Incidents require patrols to be coordinated:
  - Communication and collaboration
  - Decision making

**Towards a solution**
Automated reconfiguration by ASK-ASSIST following a dynamic scale-space paradigm

**DYNAMIC SCALE SPACE PARADIGM**

**Coalition Environment Elements**
- A coalition formation environment consists of:
  - $n$ agents
  - $A = A(0)$: active roles (roles mapping to agents)
  - $B(0)$: passive roles (contextual elements)
  - $T(0)$: tasks

**Assignment of roles to task**
An assignment of roles to tasks in a situational context at given time $t$

- $y: 2^{A(t)} \times 2^{B(t)} \rightarrow 2^{T(t)}$

**Coalition**
A coalition is a time-oriented composite task assignment to agent roles in contexts, labeled by a task number $i$ as $i$.

**Configuration**
Having a coalition formation environment, the goal is not only to generate a configuration of active roles, but also a coalition. This can lead to unexpected roles outside circumstances, e.g., a daily patrol, but also that can handle unexpected security incidents by providing improvement support to humans by newly added elements, e.g., ASK-ASSIST.

A configuration $f'_c \in F$ for the routes $c$ consists of $\forall y_i \in \forall y$.

**Solution for operational management**
- Communication, interaction, collaboration, monitoring, contextualization, decision making, reconfiguration - coalition formation, planning, scheduling

**Common Hybrid Agent Platform (CHAP) taking human in the loop**
http://chap.sourceforge.net

**Agent Development Environment**

**Agent Development Environment**

**Design Approaches**
- Customer developer aspect complexes
- Customer developer aspect complexes
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**Features**
- Ease of distribution, maintenance, self-learning
- Reconfigurability, agent libraries, coordination libraries, protocol libraries
- Domain libraries, domain tools, support, rewriting logic, process algebra, concurrent models
- Emergence, aggregation, escalation, hybridization, cooperation

**Distributed Self-Learning -- Self-Organization -- Self-Management to address Heterogeneity, Concurrency, Robustness, Scalability and Sustainability**

**Common Hybrid Agent Platform (CHAP) taking human in the loop**

**ASK-ASSIST IN RELATION TO HUMAN DECISION MAKING**

**Coevolving with those systems and organizations is governed by:**

$\gamma = \gamma_0 \cdot \gamma_1 \cdot \gamma_2 \cdot \gamma_3 \cdot \gamma_4 \cdot \gamma_5 \cdot \gamma_6 \cdot \gamma_7 \cdot \gamma_8 \cdot \gamma_9 \cdot \gamma_{10} \cdot \gamma_{11} \cdot \gamma_{12}$