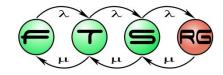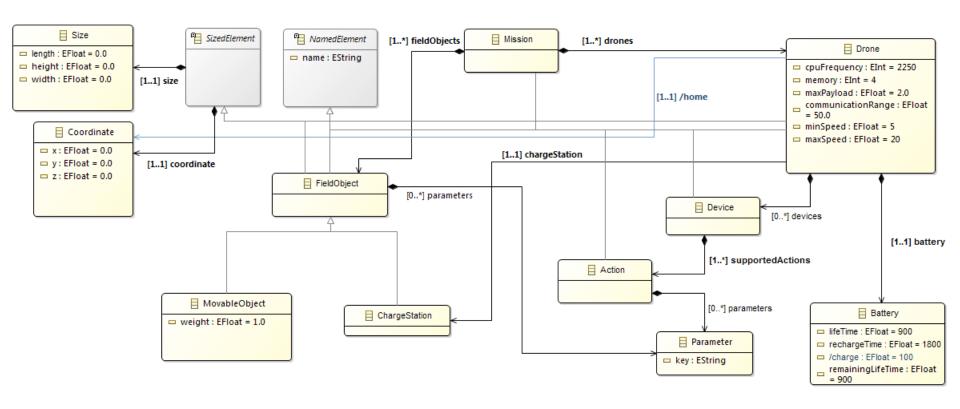# Cooperative Drones
Second Homework Assignment
DNS-2016

György Demarcsek

Krisztián Nagy

Ferenc Attila Somogyi

Budapesti Műszaki és Gazdaságtudományi Egyetem
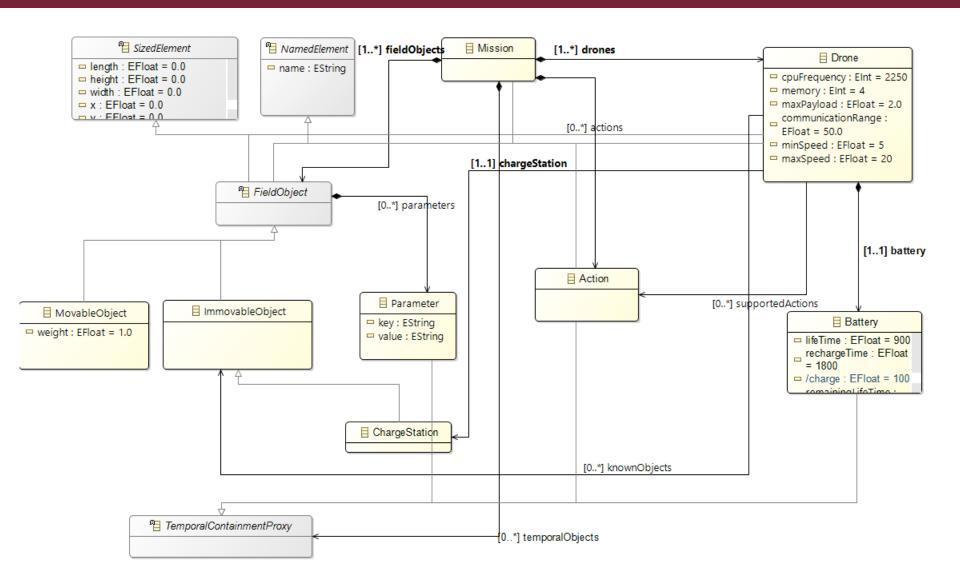**Hibatűrő Rendszerek Kutatócsoport**

Structural Metamodel Changes

- Drone – knowledge base

- FieldObject inheritance structure

- Device removed

- Size and Coordinate moved to SizedElement
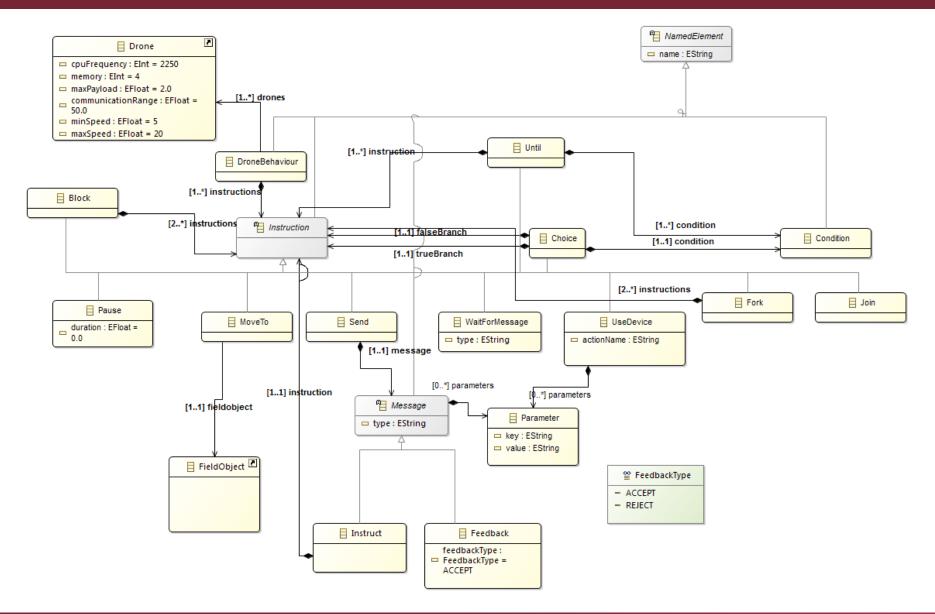
- Action containment structure changed

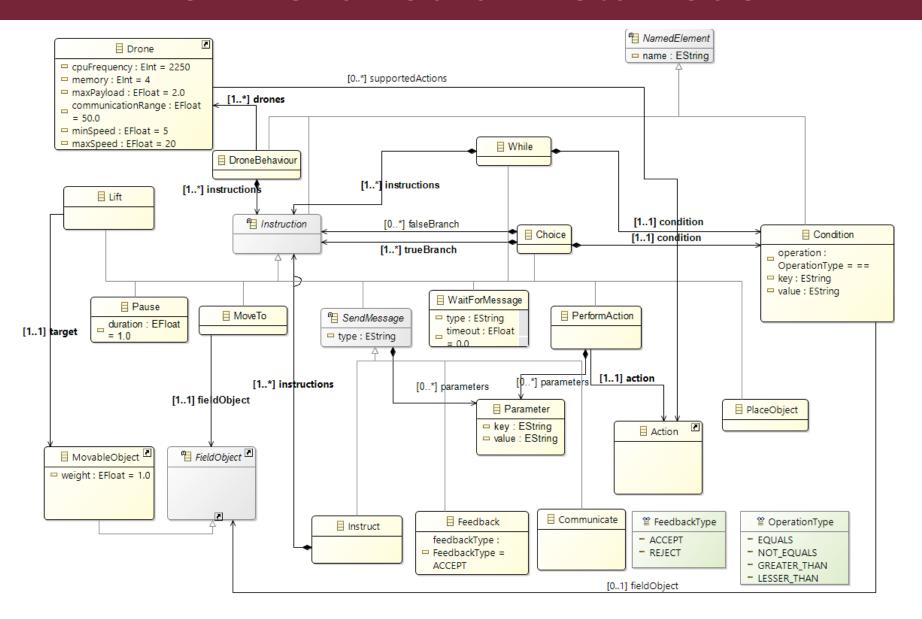# Old Behavioural Metamodel

Behavioural Metamodel Changes

- Action reference

- Block, Fork, Join removed

- Lift and PlaceObject added

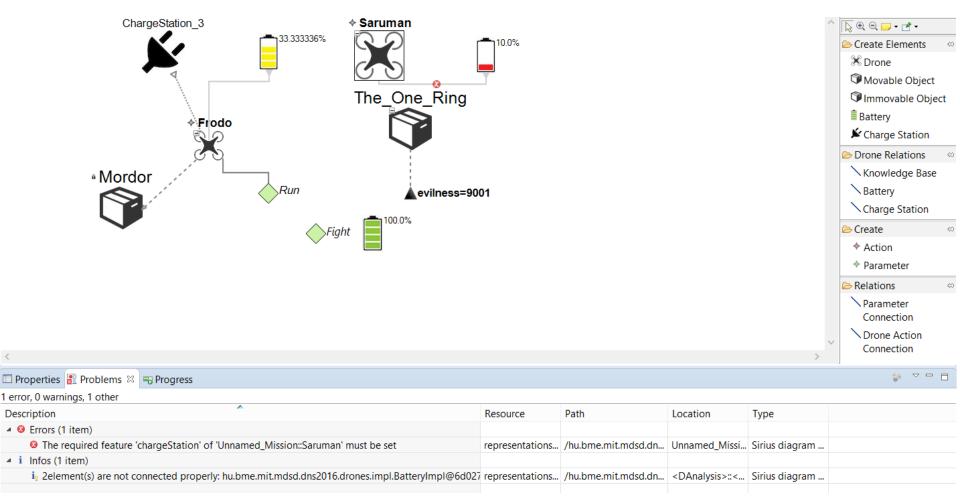- General message type added

- Condition expanded

Graphical Editor

- Rename by editing label
- Elements not directly contained by the model root can also be added via a temporary container
  - A *validation rule* verifies that no such "dangling" element exists in the final instance model (e.g.: a Battery must belong to a Drone, …)
- Supports all kinds of model elements and relationships
- Parameters and Actions ("non-physical") on separate layers
- Custom icons and folding
  - Battery icon indicates charge level via conditional style and derived feature
  - A lock icon at immovable objects

Textual Editor

- **Structural DSL**
  - Simple grammar
  - Cross-reference from behav.

- **Behavioural DSL**
  - „Traditional" syntax
  - Conformity with the metamodel
  - Validation: references, invalid values

```
Mission {
    Actions {
        Drill, Gather, Fire, Scan
    }

    Drone MinerDrone { Drill, Gather }
    Drone SupervisorDrone { Fire, Scan }

    ChargeStation TeslaSuperCharger;
    ImmovableObject MineralResource;
    ImmovableObject BaseEntrance;
    ImmovableObject HalfwayToMineral;
}
```

```
behav WorkerBehav {MinerDrone}

while (MineralResource.MineralCount > 0)
{
    moveto MineralResource;
    action Drill;
    moveto TeslaSuperCharger;
    action Gather;
}

moveto TeslaSuperCharger;
```

```
behav GuardBehav {SupervisorDrone}

while (MineralResource.MineralCount > 0)
{
    moveto BaseEntrance;
    action Scan;

    if (BaseEntrance.EnemyCount > 0) {
        msg instruct [GetToSafety]
        {
            moveto TeslaSuperCharger;
            waitfor [Return];
        }
    }

    while (BaseEntrance.EnemyCount > 0) {
        action Fire;
    }

    msg comm [Return];

    moveto HalfwayToMineral;
    wait 5.0;
}

moveto TeslaSuperCharger;
```

Summary

- Important refinements to the metamodels
  - Device, Action, Lift etc.
- Graphical Editor
  - Expressive visuals
  - Supports the whole metamodel
- Textual Editor
  - „Traditional syntax"
  - Easy-to-use