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## 1 solutions1 Theory

**Built:** 18 August 2019

**Parent Theories:** example1

### 1.1 Theorems

[aclExercise1]

$\vdash (M, Oi, Os) \text{ sat Name Alice says prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Bob says prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Alice meet Name Bob says prop go}$

[aclExercise1A]

$\vdash (M, Oi, Os) \text{ sat Name Alice says prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Bob says prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Alice meet Name Bob says prop go}$

[aclExercise1B]

$\vdash (M, Oi, Os) \text{ sat Name Alice says prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Bob says prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Alice meet Name Bob says prop go}$

[aclExercise2]

$\vdash (M, Oi, Os) \text{ sat Name Bob says prop launch}$

[aclExercise2A]

$\vdash (M, Oi, Os) \text{ sat Name Alice says prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Alice controls prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat prop go impf prop launch} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Bob says prop launch}$

[aclExercise2B]

$\vdash (M, Oi, Os) \text{ sat Name Alice says prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Alice controls prop go} \Rightarrow$   
 $(M, Oi, Os) \text{ sat prop go impf prop launch} \Rightarrow$   
 $(M, Oi, Os) \text{ sat Name Bob says prop launch}$

## 2 conops0Solution Theory

**Built:** 18 August 2019

**Parent Theories:** aclDrules

## 2.1 Datatypes

*commands* = go | nogo | launch | abort | activate | stand\_down

*keyPrinc* = Staff people | Role roles | Ap num

*people* = Alice | Bob

*principals* = PR keyPrinc | Key keyPrinc

*roles* = Commander | Operator | CA

## 2.2 Theorems

[ApRuleActivate\_thm]

```

⊢ (M, Oi, Os) sat
  Name (PR (Role Operator)) controls prop launch ⇒
    (M, Oi, Os) sat
    reps (Name (PR (Staff Bob))) (Name (PR (Role Operator)))
      (prop launch) ⇒
        (M, Oi, Os) sat
        Name (Key (Staff Bob)) quoting Name (PR (Role Operator)) says
          prop launch ⇒
            (M, Oi, Os) sat prop launch impf prop activate ⇒
              (M, Oi, Os) sat
              Name (Key (Role CA)) speaks_for Name (PR (Role CA)) ⇒
                (M, Oi, Os) sat
                Name (Key (Role CA)) says
                  Name (Key (Staff Bob)) speaks_for Name (PR (Staff Bob)) ⇒
                    (M, Oi, Os) sat
                    Name (PR (Role CA)) controls
                      Name (Key (Staff Bob)) speaks_for Name (PR (Staff Bob)) ⇒
                        (M, Oi, Os) sat prop activate

```

[ApRuleStandDown\_thm]

```

⊢ (M, Oi, Os) sat Name (PR (Role Operator)) controls prop abort ⇒
  (M, Oi, Os) sat
  reps (Name (PR (Staff Bob))) (Name (PR (Role Operator)))
    (prop abort) ⇒
      (M, Oi, Os) sat
      Name (Key (Staff Bob)) quoting Name (PR (Role Operator)) says
        prop abort ⇒
          (M, Oi, Os) sat prop abort impf prop stand_down ⇒
            (M, Oi, Os) sat
            Name (Key (Role CA)) speaks_for Name (PR (Role CA)) ⇒

```

```

(M, Oi, Os) sat
Name (Key (Role CA)) says
Name (Key (Staff Bob)) speaks_for Name (PR (Staff Bob)) ⇒
(M, Oi, Os) sat
Name (PR (Role CA)) controls
Name (Key (Staff Bob)) speaks_for Name (PR (Staff Bob)) ⇒
(M, Oi, Os) sat prop stand_down

```

## [OpRuleAbort\_thm]

```

⊢ (M, Oi, Os) sat Name (PR (Role Commander)) controls prop nogo ⇒
(M, Oi, Os) sat
reps (Name (PR (Staff Alice))) (Name (PR (Role Commander)))
(prop nogo) ⇒
(M, Oi, Os) sat
Name (Key (Staff Alice)) quoting
Name (PR (Role Commander)) says prop nogo ⇒
(M, Oi, Os) sat prop nogo impf prop abort ⇒
(M, Oi, Os) sat
Name (Key (Role CA)) speaks_for Name (PR (Role CA)) ⇒
(M, Oi, Os) sat
Name (Key (Role CA)) says
Name (Key (Staff Alice)) speaks_for Name (PR (Staff Alice)) ⇒
(M, Oi, Os) sat
Name (Key (Staff Bob)) quoting Name (PR (Role Operator)) says
prop abort

```

## [OpRuleLaunch\_thm]

```

⊢ (M, Oi, Os) sat Name (PR (Role Commander)) controls prop go ⇒
(M, Oi, Os) sat
reps (Name (PR (Staff Alice))) (Name (PR (Role Commander)))
(prop go) ⇒
(M, Oi, Os) sat
Name (Key (Staff Alice)) quoting
Name (PR (Role Commander)) says prop go ⇒
(M, Oi, Os) sat prop go impf prop launch ⇒
(M, Oi, Os) sat
Name (Key (Role CA)) speaks_for Name (PR (Role CA)) ⇒
(M, Oi, Os) sat
Name (Key (Role CA)) says
Name (Key (Staff Alice)) speaks_for Name (PR (Staff Alice)) ⇒
(M, Oi, Os) sat
Name (PR (Role CA)) controls
Name (Key (Staff Alice)) speaks_for Name (PR (Staff Alice)) ⇒
(M, Oi, Os) sat

```

Name (Key (Staff Bob)) quoting Name (PR (Role Operator)) says  
prop launch

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