TCR Remote Monitoring for the LHC Technical Infrastructure

M.C. Morodo Testa (ST/CV)
S. Poulsen (ST/EL)
U. Epting (ST/MA)

Outline

- Purpose
- Procedure
- Clients and project organization
- Integration lifecycle
- Problems and solutions
- Conclusion

Purpose

- Equipment
  - local installation and responsibility
  - operational 24h/day -> monitoring needed

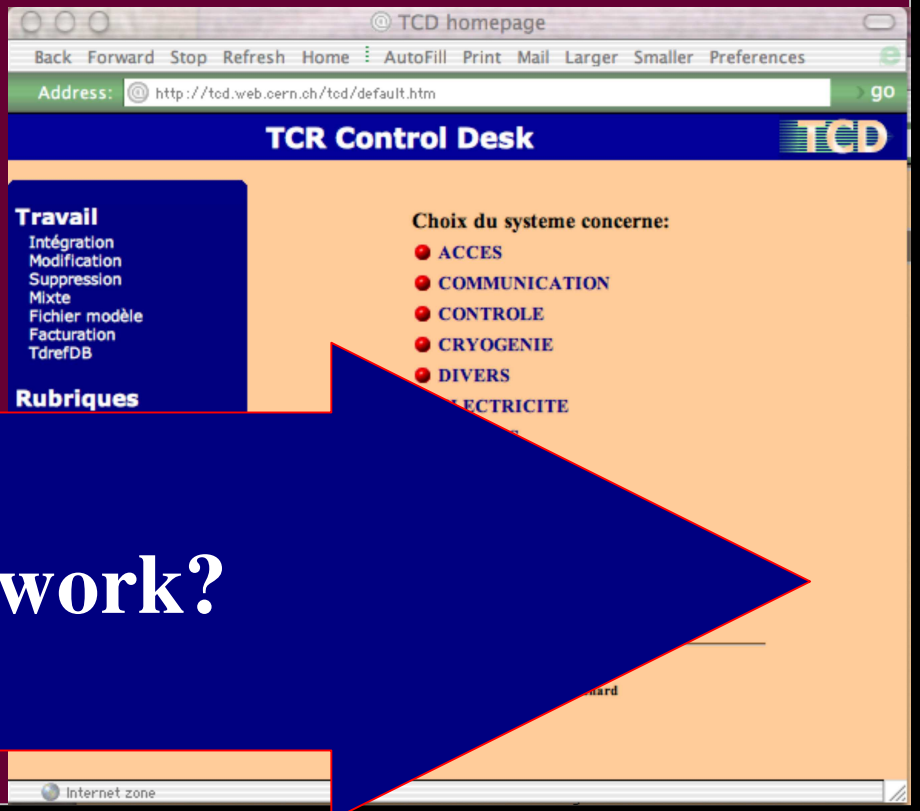
Communication (technical)

Communication (human)

- TCR
  - common control room to monitor equipment from different groups
  - first line intervention by TCR (outside working hours)
  - troubleshooting by the equipment groups

Procedure

- Easy procedure = TCR Control Desk (**TCD**)
  - exists since 2000
  - approved procedure (used more than 600 times)
  - covers both:
    - projects
    - operation/maintenance



How does it work?

TCD Procedure

Equipment Group

TCR and ST/MA/IN

Announce equipment installation or change

Define linkmen (Equipment expert and TCR operator)

Establish planning
Define data (alarms, signals, mimic diagrams, tools, ...)

Equipment installation

Data integration

Test
Reception

Operation and Maintenance Phase

Clients

- ST/EL
  - ENS integration
- ST/CV
  - Water 2000
  - LHC ventilation
  - Computer centre ventilation
  - ...
- ST/MA/AS
  - Fire detection
  - Gaz detection
- Others (mainly for GTPM)
  - Vacuum
  - Access Control
  - ...

Project leader

Technical expert

Group linkman

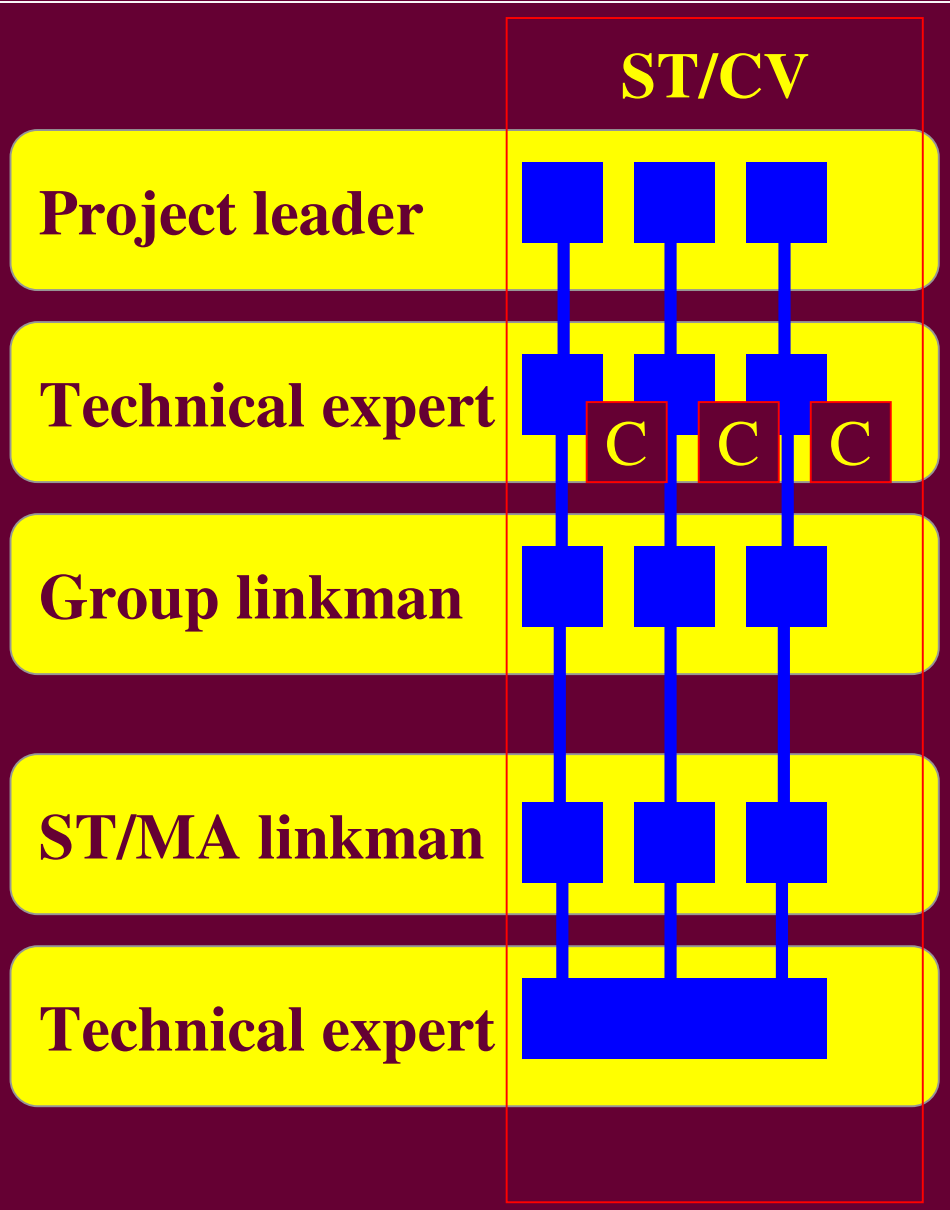
ST/MA linkman

Technical expert

ST/EL Organization

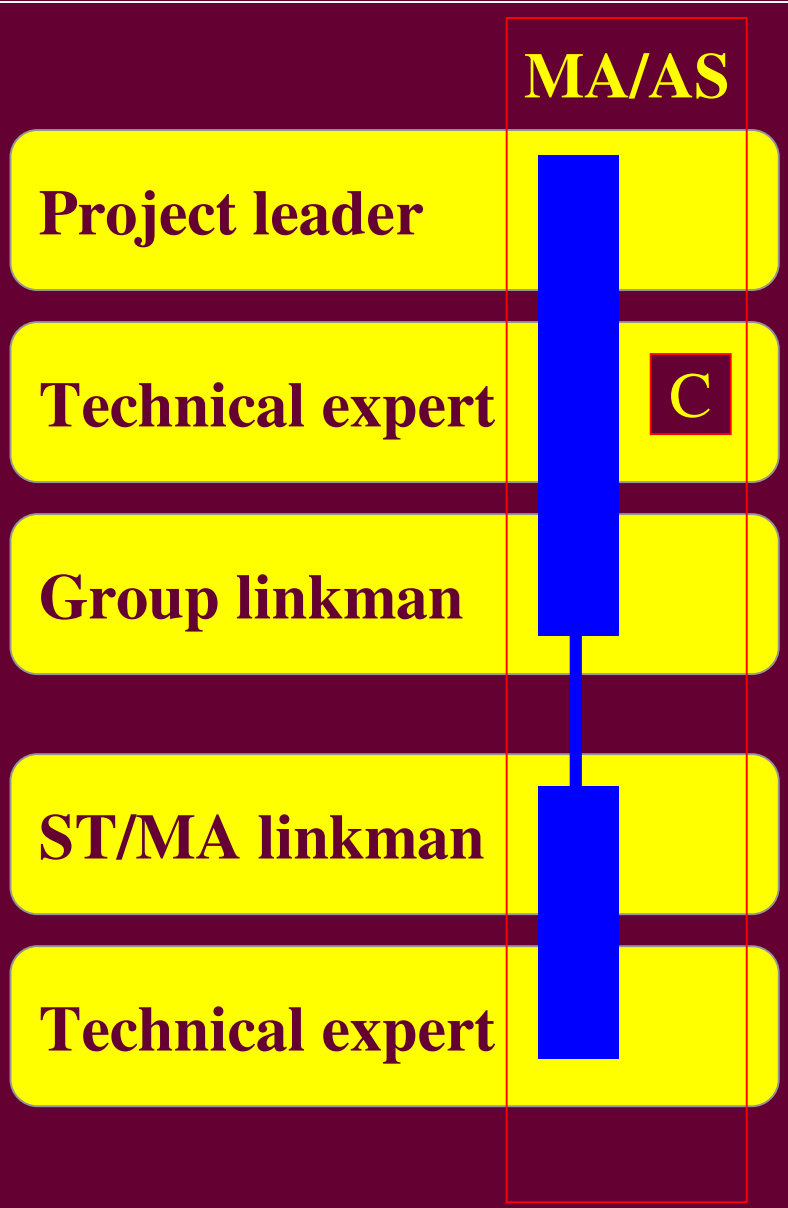
- ST/EL (ENS)
  - One linkman (EL and TCR) for all problems
  - Single data exchange interface (GATEX), one contractor
  - No change from project start to operation phase since 3 years

ST/CV Organization



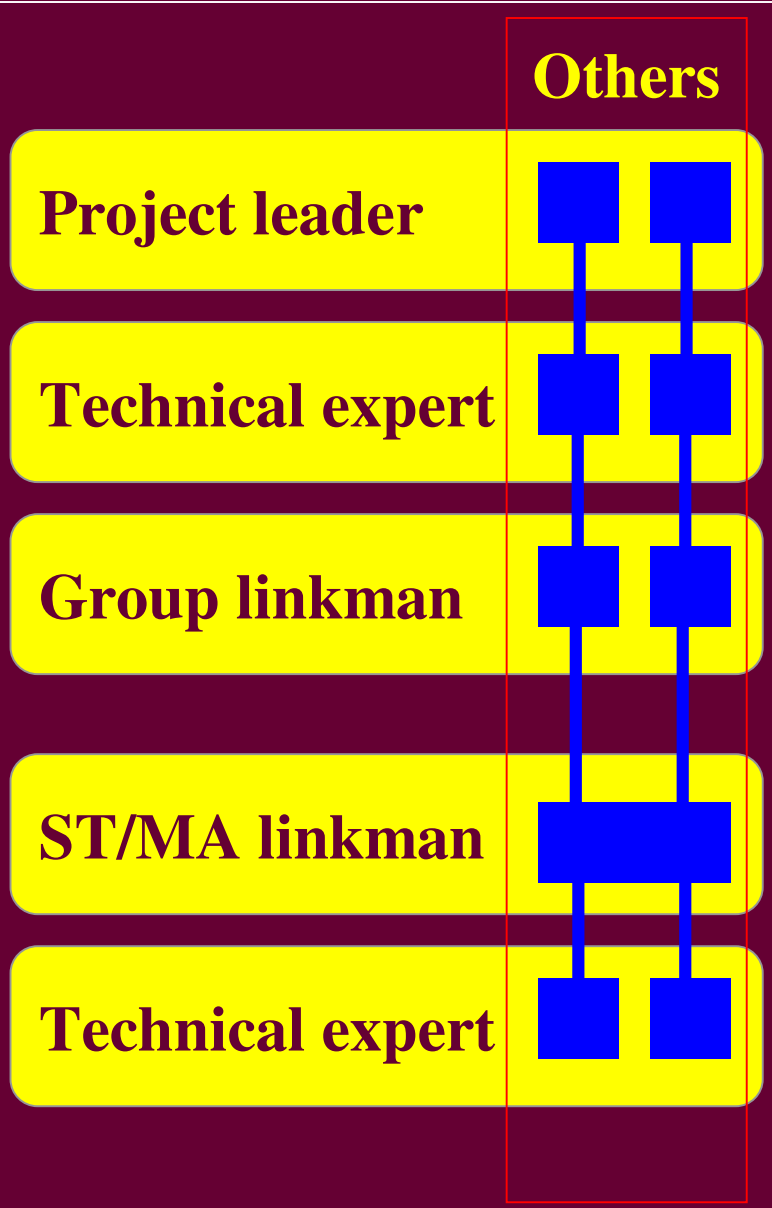
- ST/CV
  - Linkman per project (CV and TCR)
  - 2 data exchange interfaces of 2 different contractors (SCADA-ECs) + direct PLC access (Dsec)
  - Project and operation done by different teams

ST/MA/AS Organization



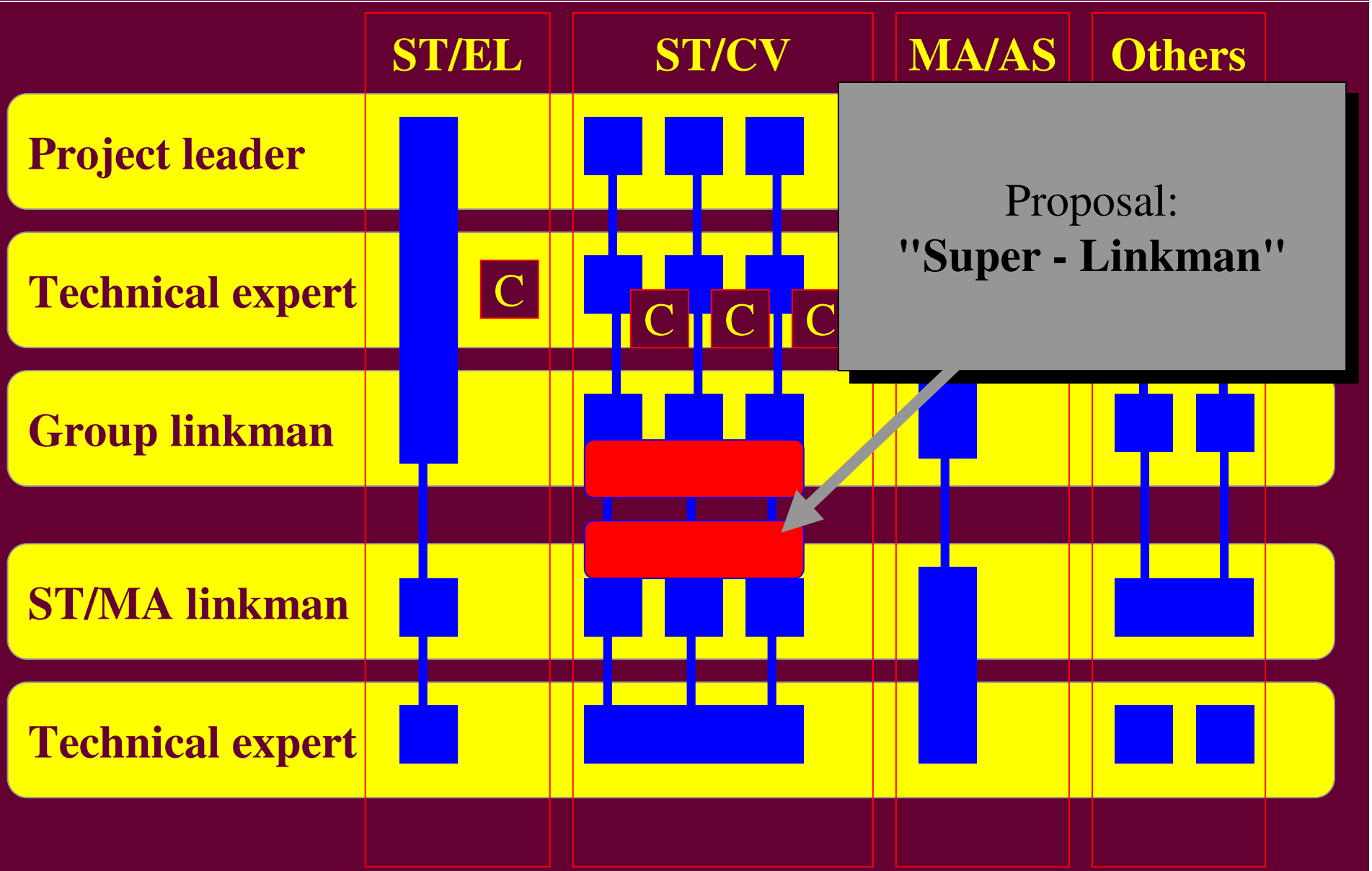
- ST/MA/AS (Fire- and Gaz Detection)
  - One linkman
  - One data exchange interface (PLC, Dsec)
  - Installation, maintenance and upgrades done by ST/MA/IN

Others - Organization

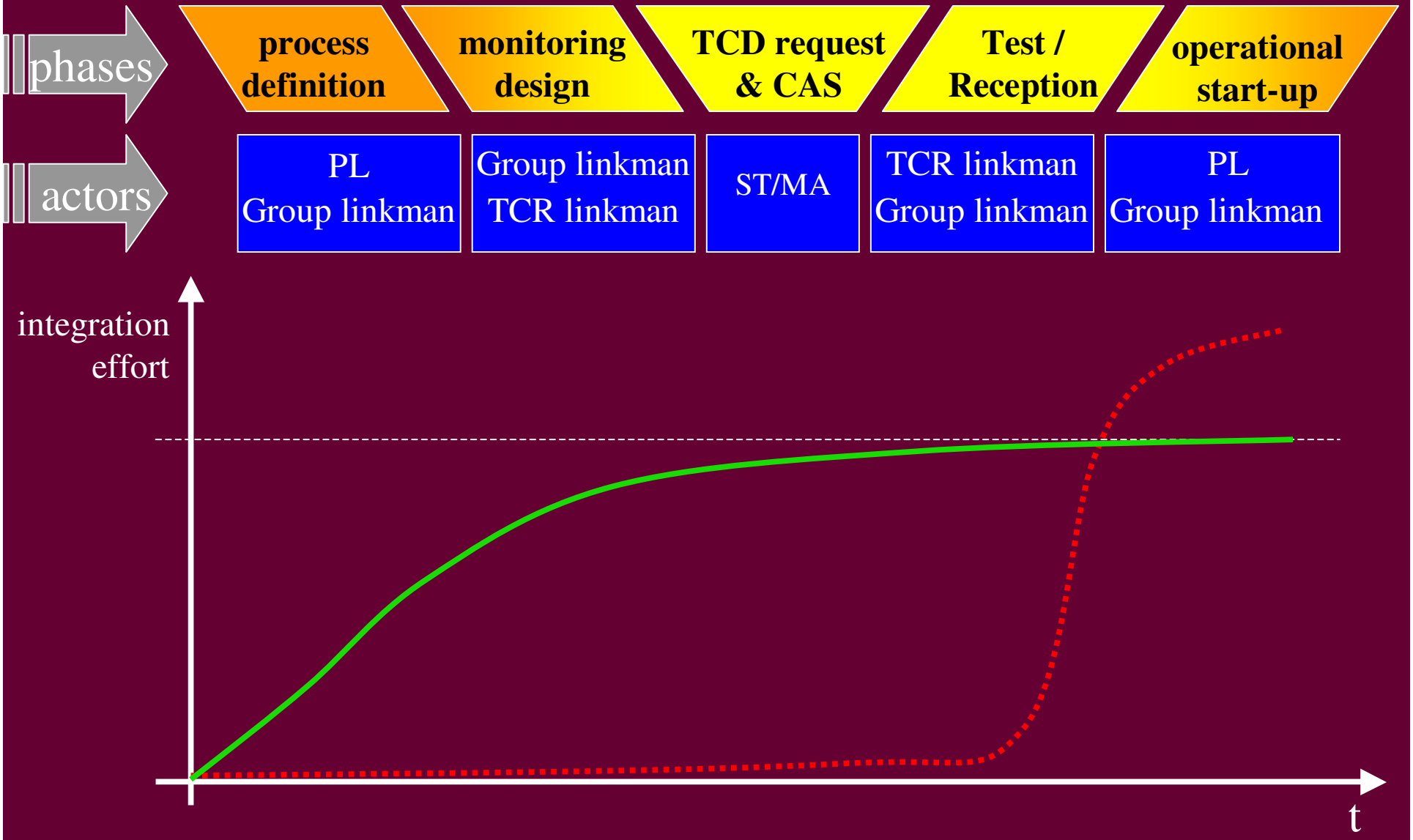


- Others (Vacuum, Access Control, ...)
  - Linkman per group
  - different data exchange interfaces, maintained by ST/MA/IN
  - not critical for operation
  - Alarms handled directly with AB/CO (CAS)
  - Mimic diagrams often delivered by groups

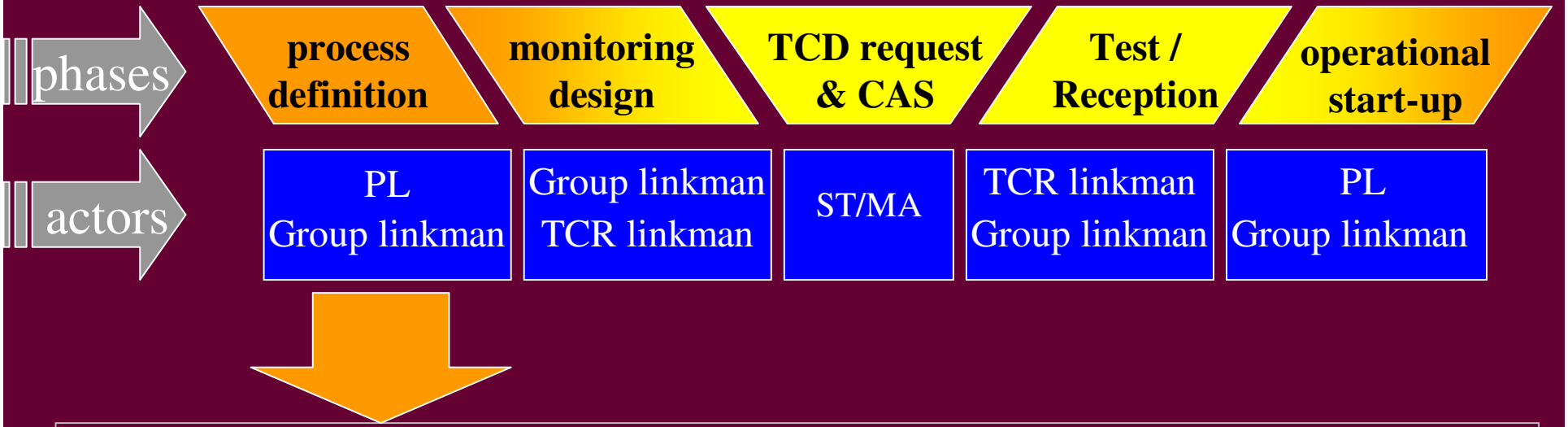
Current Organization



Integration life cycle

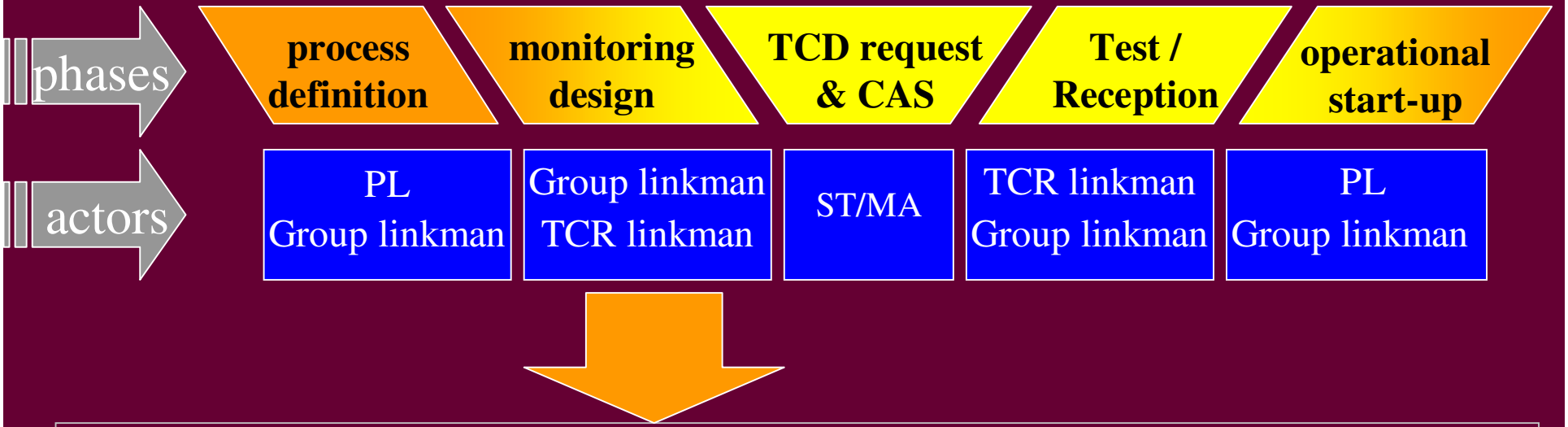


Problems and Solutions



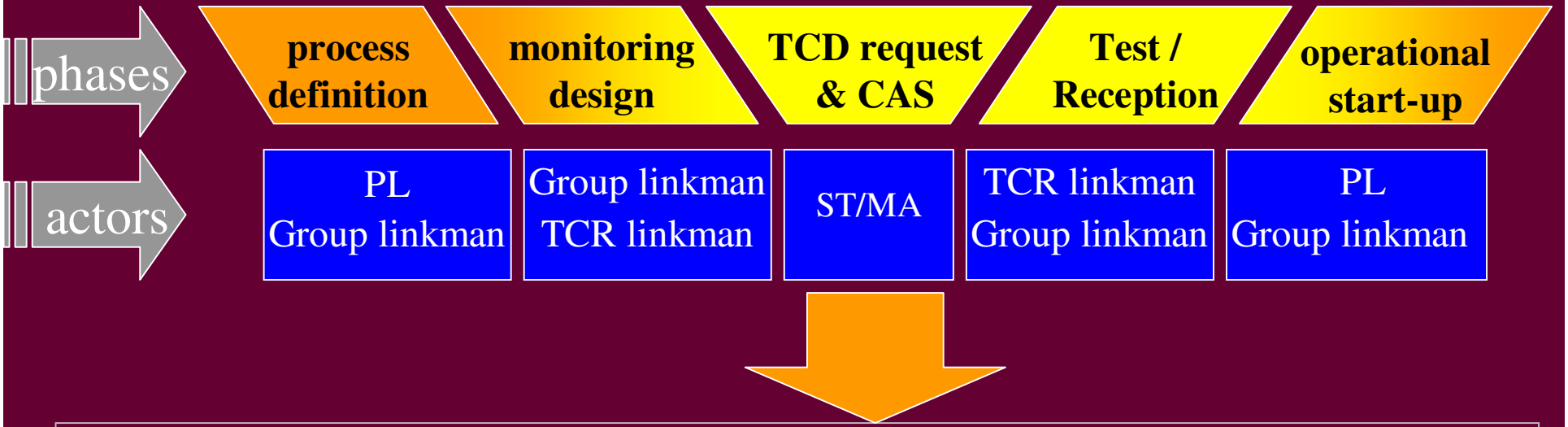
- Project launch
  - Planning not always in phase with TCR availability
    - define ST/MA linkman from the beginning
    - include TCR integration phase in planning
  - TCR tools requirements not known
    - foresee special development for integration

Problems and Solutions



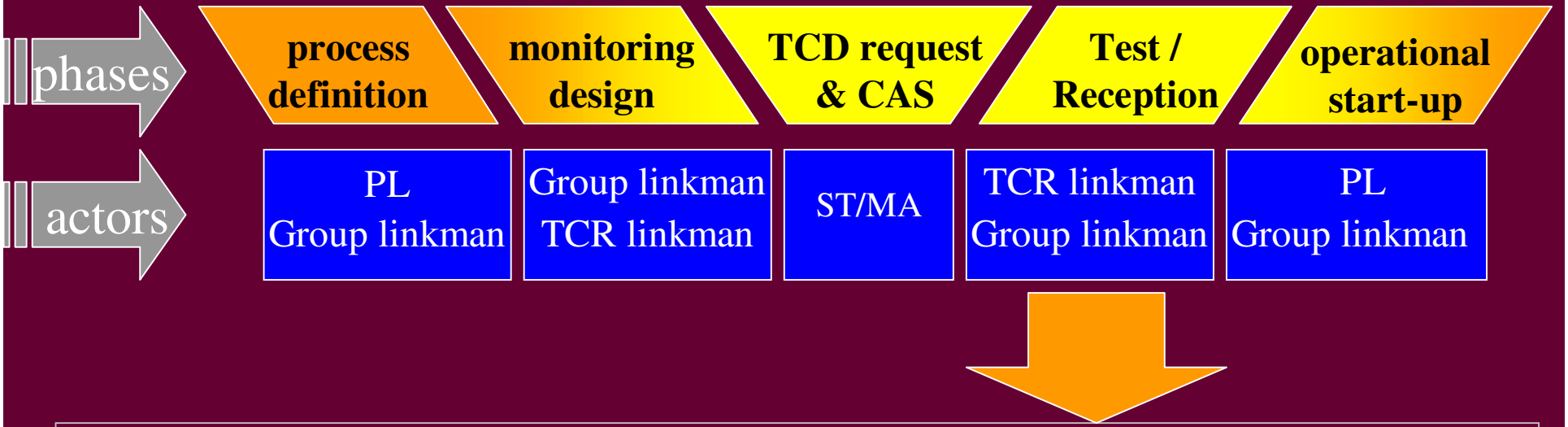
- Operation and Monitoring roles often unclear
  - define monitoring role in early project phase
- Monitoring needs not known
  - invite linkman to all project meetings
  - include this point on the meeting agenda

Problems and Solutions



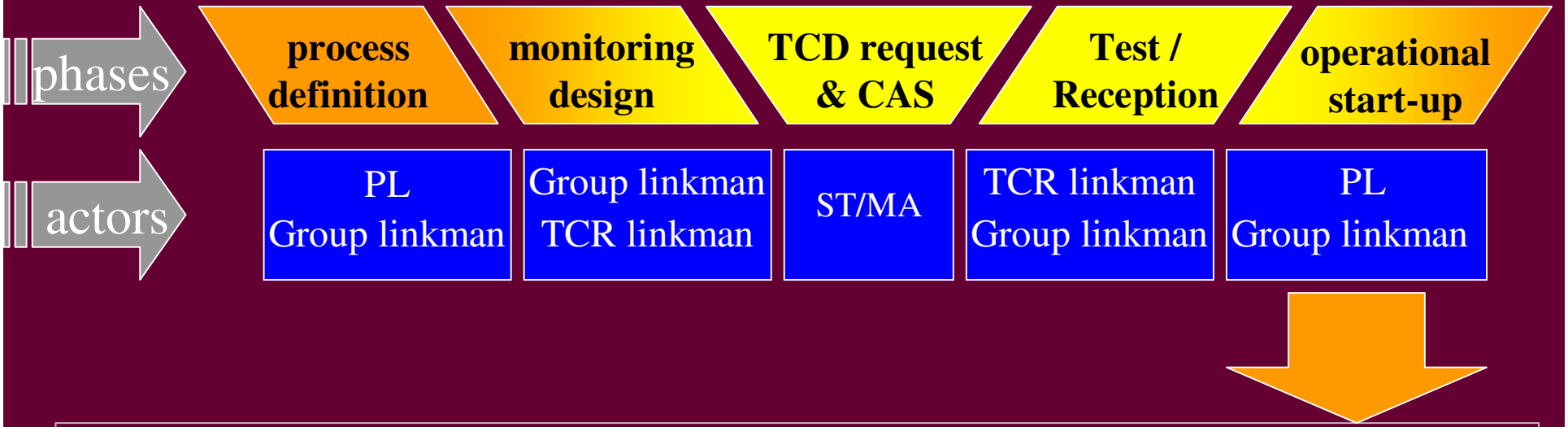
- Alarm and signal definition
  - careful signal and alarm definition to avoid changes during integration phase
- Mimic Diagrams for TCR
  - use of web based mimic diagrams encouraged
  - development by equipment groups based on TCR-HCI conventions

Problems and Solutions



- Reception
  - sometimes unclear as equipment runs even if integration tests failed
    - foresee enough time for corrections in case of failed tests
  - prepare TCR operator training and clear instructions for troubleshooting

Problems and Solutions



- Operation and maintenance
  - Changes must be coordinated on both sides
    - foresee procedure for changes
  - be prepared for hard- and software evolution (e.g.: OS updates, API changes, ...)

Conclusion

- Technical problems almost solved
- Organizational challenges identified

- Let's do it ...

Questions

Current situation

- Number of linkmen
  - already reduced
    - improvements still possible
- Meetings
  - integration issues now addressed in progress meetings
    - must be included already in design phase
- TCR Mimic Diagrams
  - HCI conventions exist
    - improve common development
- Data Exchange Interfaces
  - Homogenisation envisaged
    - started but not yet finished