SpW-D
Proposed Contents of Standard

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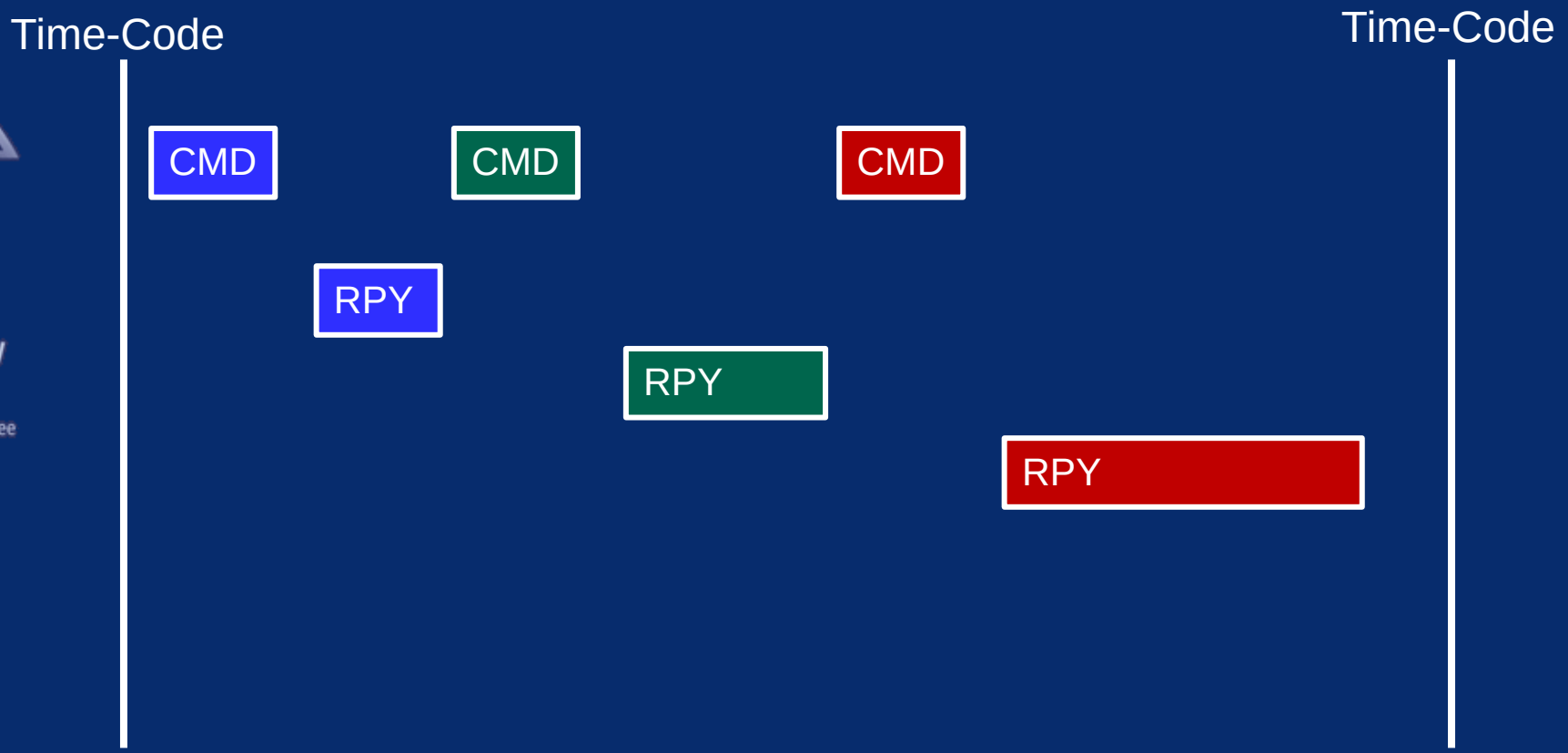
Proposed Contents of SpW-D Spec.

- Am currently drafting SpW-D specification
- Written in ECSS format
- Want to make sure that what I am putting in the specification is what people want

Multiple Transactions in Single Time-Slot



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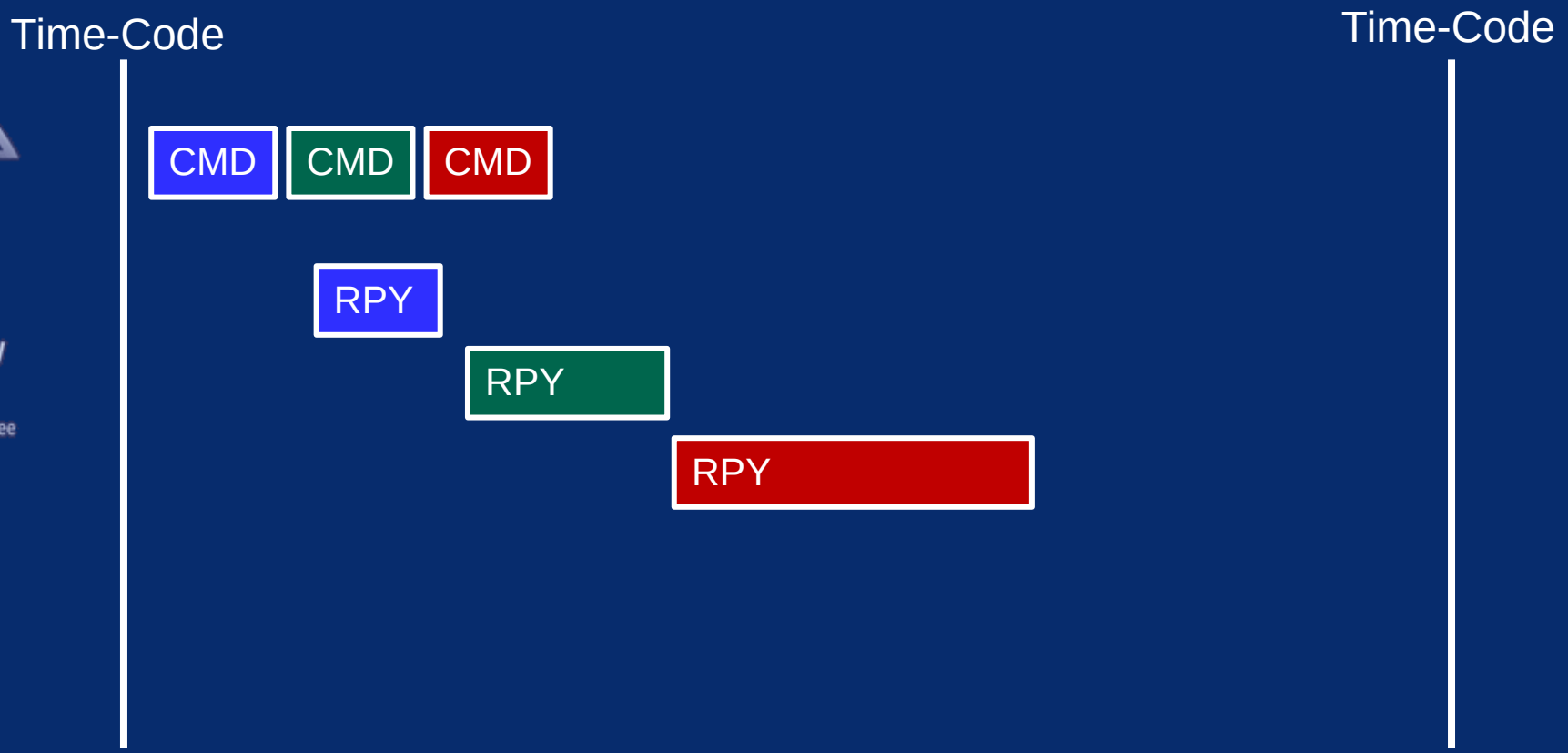
Multiple Transactions in Single Time-Slot



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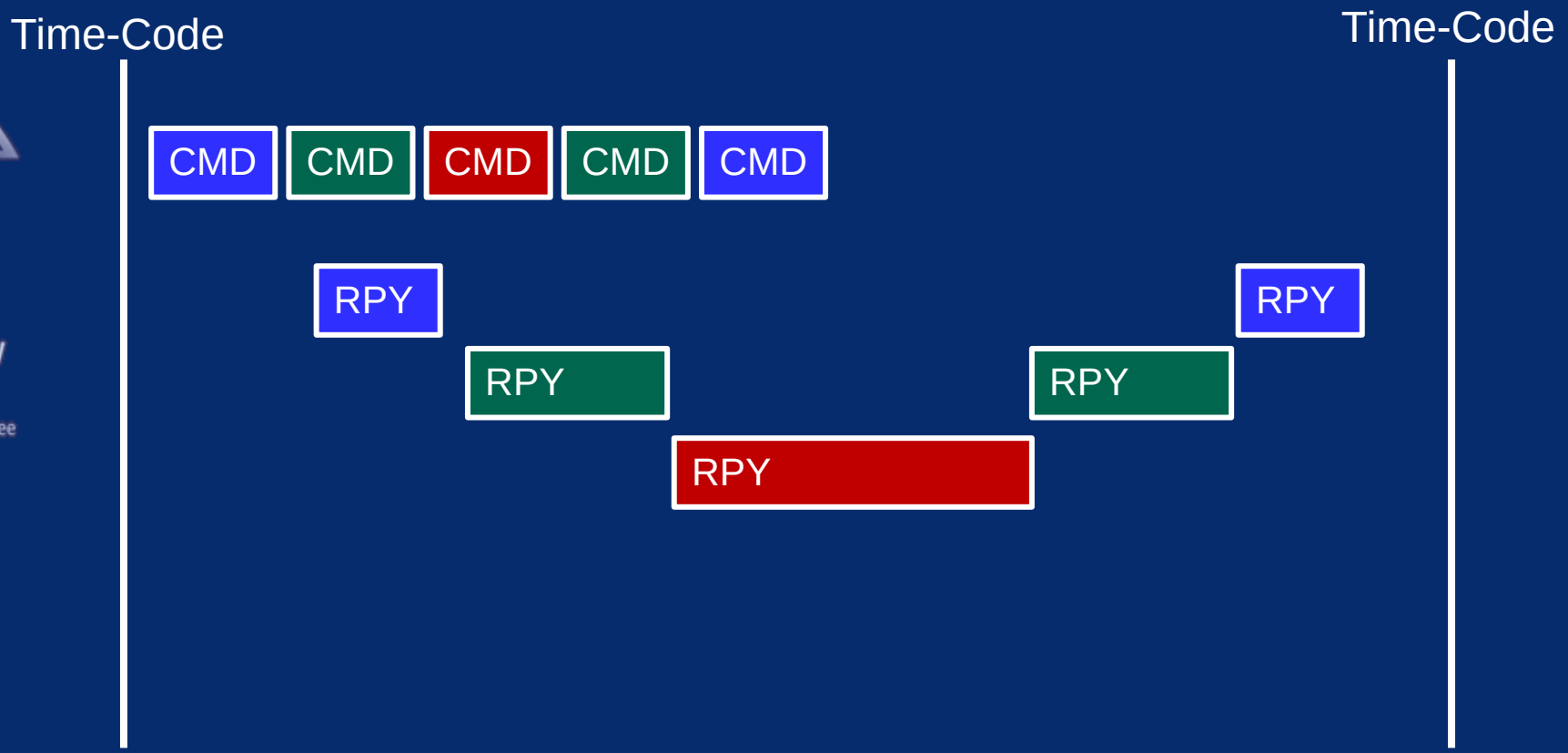
Multiple Transactions in Single Time-Slot



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SpW-D Specification

- Propose
  - Multiple transactions in a single time-slot
  - Time-slot interval is a mission specific parameter
  - Determined by the mission system engineer
  - Set by the time-code frequency
  - Permit posted transactions

Schedule

- Schedule arranged to avoid conflicting use of network resources
- In a single slot can have
  - Parallel Initiators with specified Targets or groups of Targets
  - Single Initiator that can send commands to any Target

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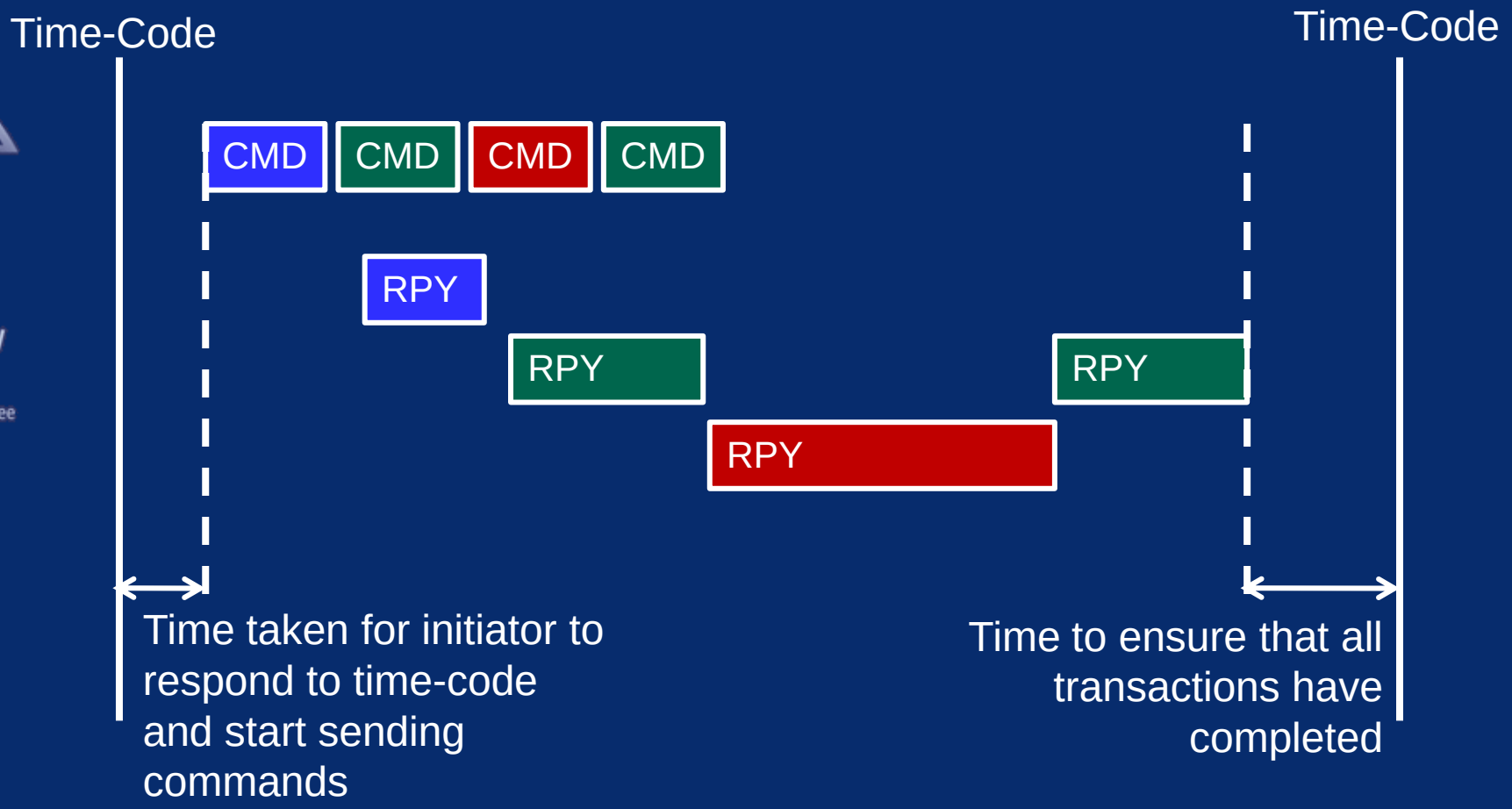
SpW-D Specification

- Propose
  - Schedule table provided for each initiator
    - Defines which time-slots that initiator is allowed to send data
  - When multiple initiators sending in a single time-slot
    - Schedule table also defines which targets the initiator can send command to

Initiator Response and Transactions Complete



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SpW-D Specification

- Propose
  - It is the responsibility of the system engineer
    - To ensure that all transactions complete
    - Within time-clot
  - Specify
    - Responses from commands sent in a time-slot
    - Must be received before the next time-code arrives
  - Otherwise an error will be reported by the initiator that sent the command

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Existing Hardware

- Targets
  - Any Target
    - Provided it fits into the schedule
    - Normally, a target should respond to a command reasonably quickly
- Initiators
  - On time-code Initiator
    - Checks all transactions complete
      - Flags error if not
    - Sends out command
  - May
    - Prepare commands before time-code received
    - Send them once time-code received

SpW-D Specification

- Propose
  - NOT to specify any performance parameter
    - Of initiator or target
  - Only requirement is
    - All transactions initiated in a time-slot
    - Must finish by the end of the time-slot
    - i.e. by the time the next time-code arrives
  - Otherwise
    - Error flagged

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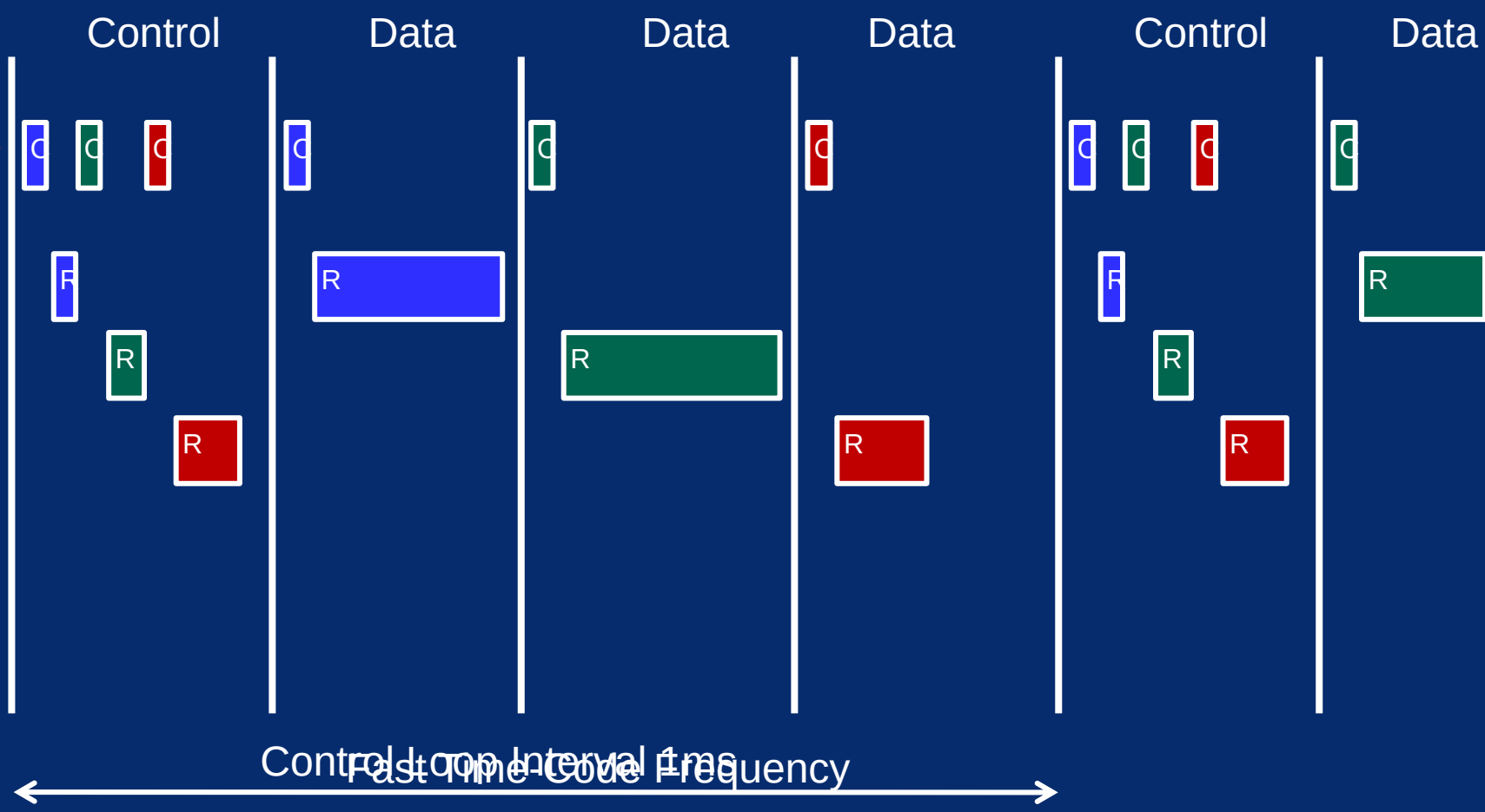
FDIR

- Initiator can check that all transactions completed by time next time-code received
- Can do this because RMAP transactions can provide acknowledgement
- If an error is detected,
  - Can notify network manager
  - If it happens again can cease sending and notify network manager
  - Etc.
- RMAP, time-code and schedule provide a means of detecting faults.

Control and Data Transfers



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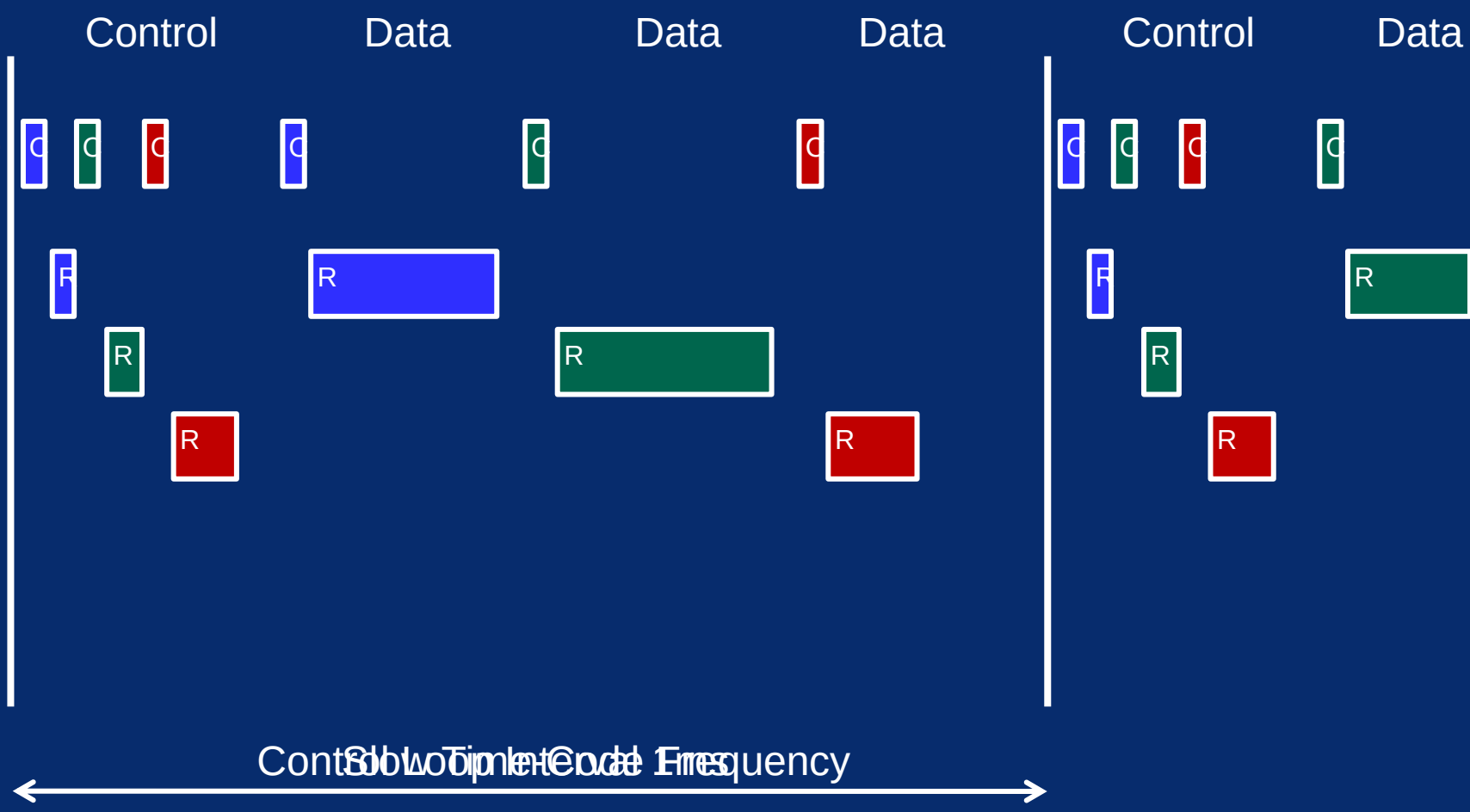
Control and Data Transfers



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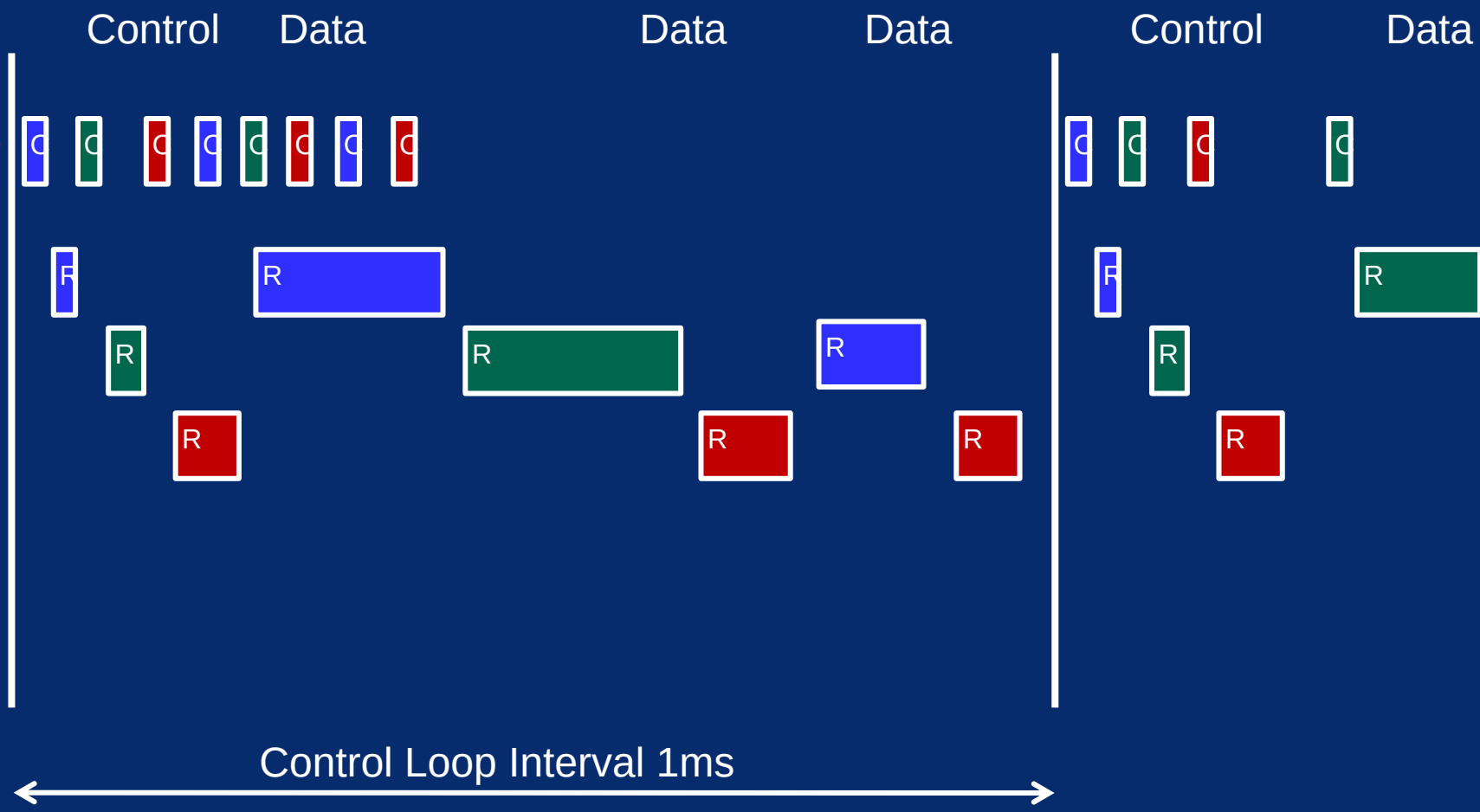
Control and Data Transfers



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SpW-D Specification

- Propose
  - Deterministic transactions initiated at the start of a time-slot
  - Recommend time-slot interval set to shortest required deterministic cycle time
    - E.g. shortest control loop time
  - Will also add options for
    - Using local clock
    - Synchronised with time-codes
    - Can then cope with missing time-code

SpW-D Specification

- RMAP transactions
  - Will only consider data transfer using RMAP transactions
- Will include method for segmenting data
  - And re-assembling segments
- Will not include any retry mechanism

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Conclusion

- Specification currently being drafted
- Built on SpaceWire and RMAP standards
- Uses time-codes to produce time-slots
- Schedules communication in time-slots
- Uses RMAP transactions
- Can support FDIR
- Simple to implement using existing devices
- Multiple transactions in slot
  - More efficient
  - Relaxes implementation constraints
- Supports SOIS sub-network services