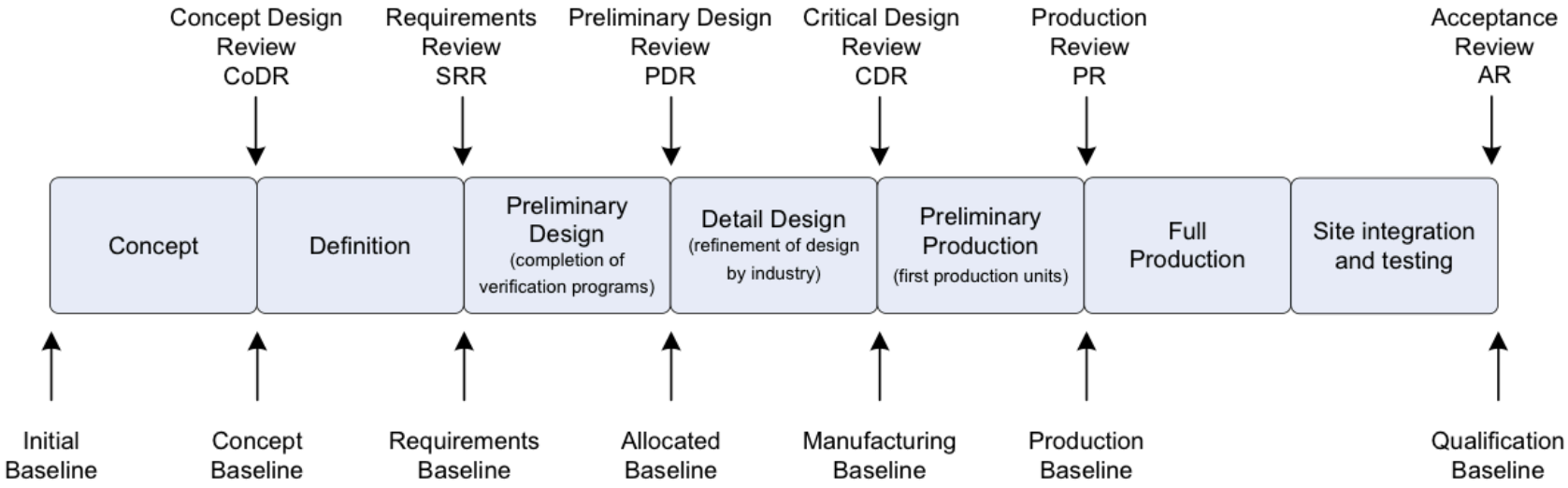
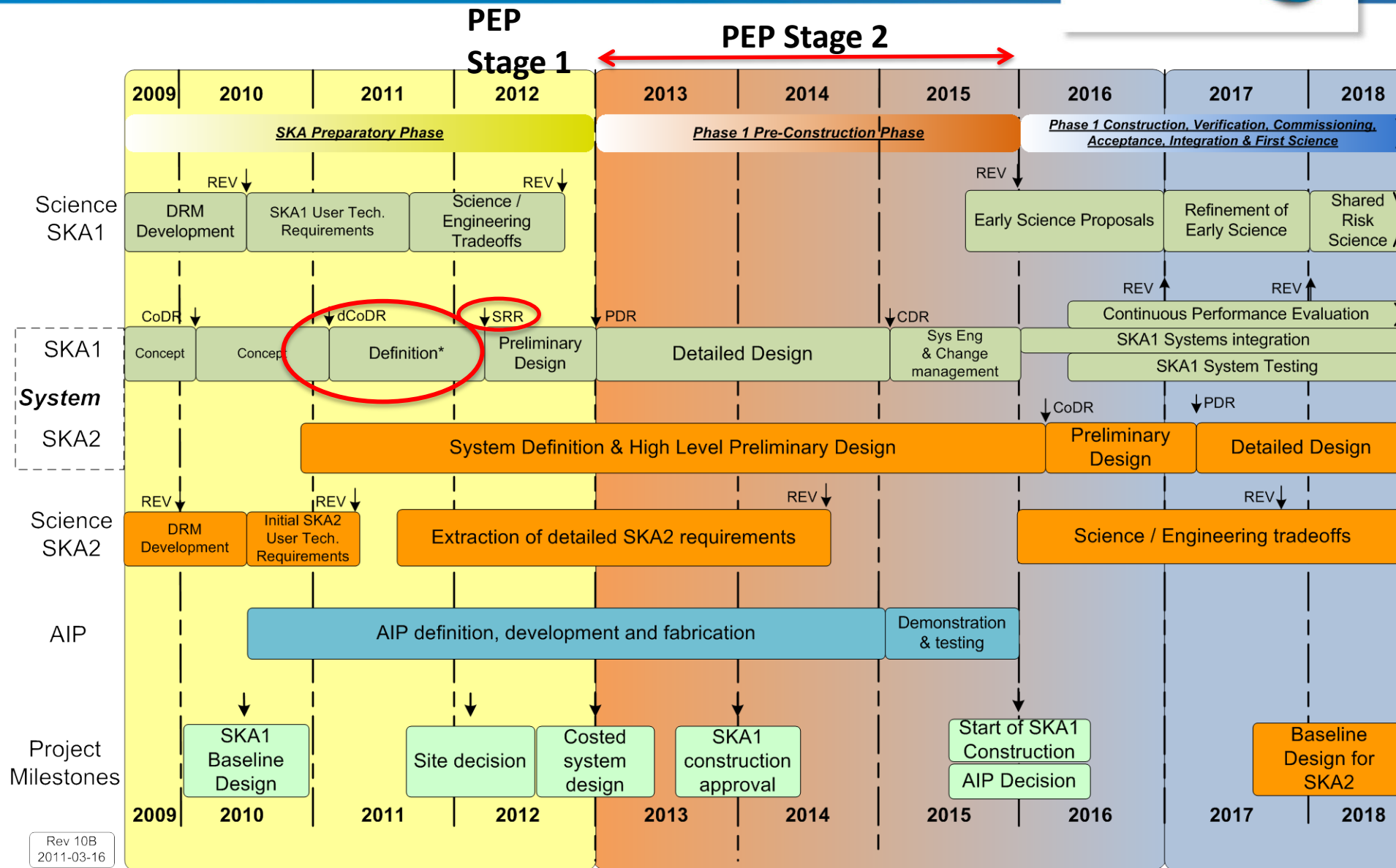
Strategy to Proceed

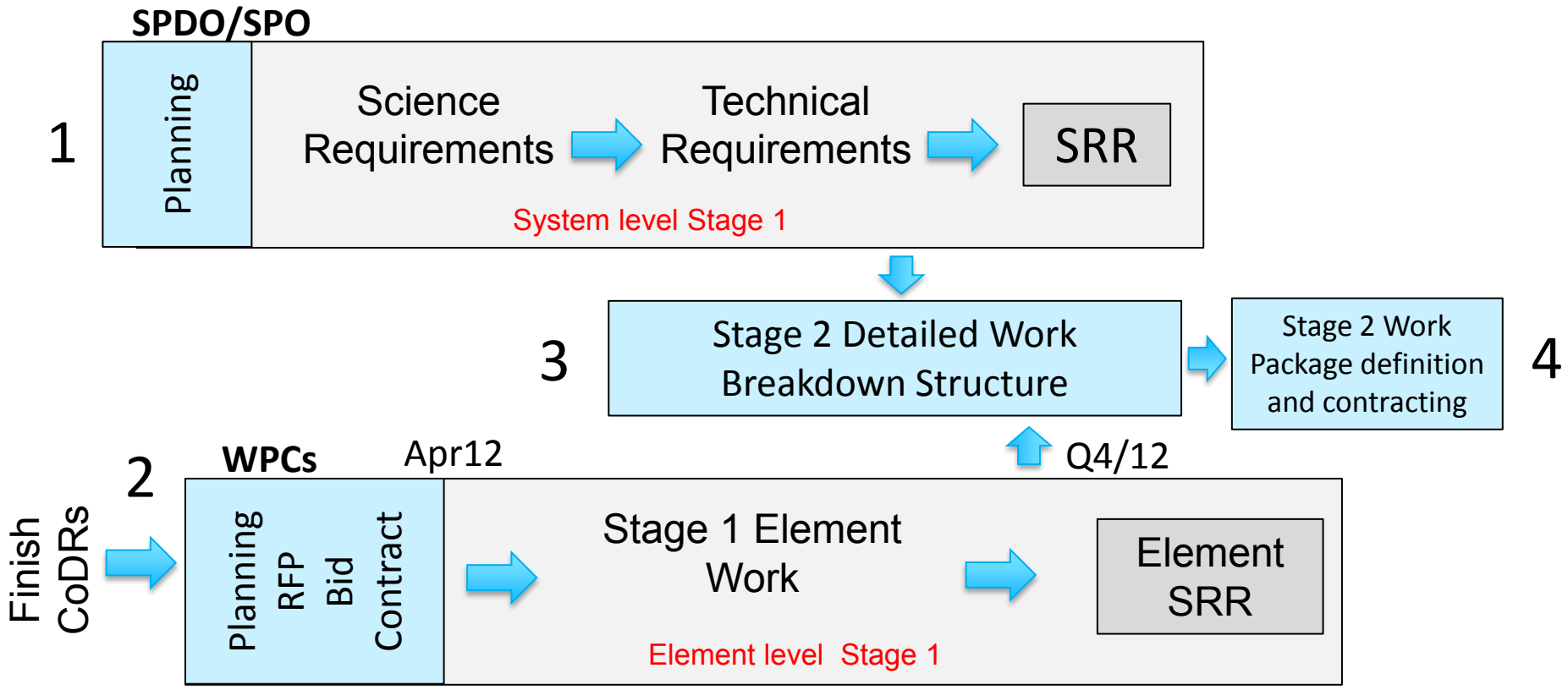
Phases of the SKA



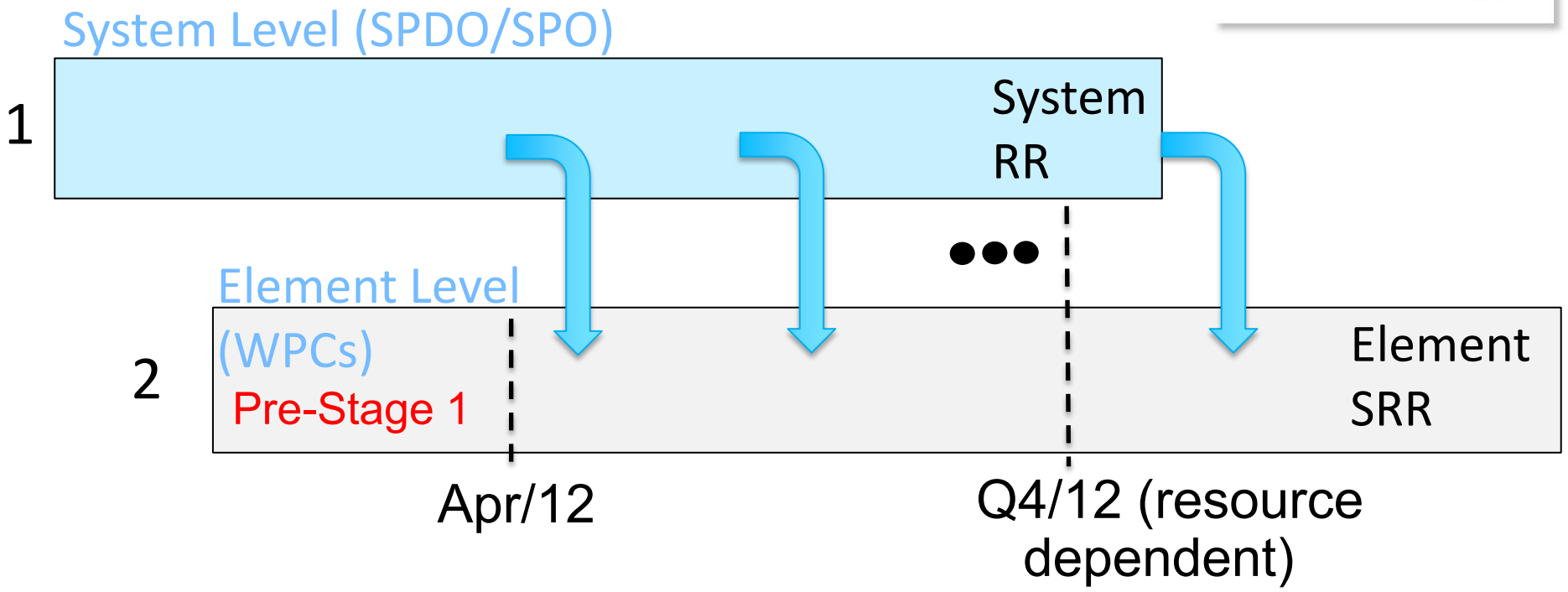
Context for Pre-Construction Phase



Stage 1:
System and Element Work in 2012-3



Allocation of Requirements from System to Element level



- 1st allocation is science requirements, operations requirements (Instrument Requirements Review).
- Later allocations are extensibility requirements and non-functional requirements.

WPC Element Work in 2012-3

Pre-Stage 1

Planning

CoDR => SRR Work

(See next slide)

Stage 1

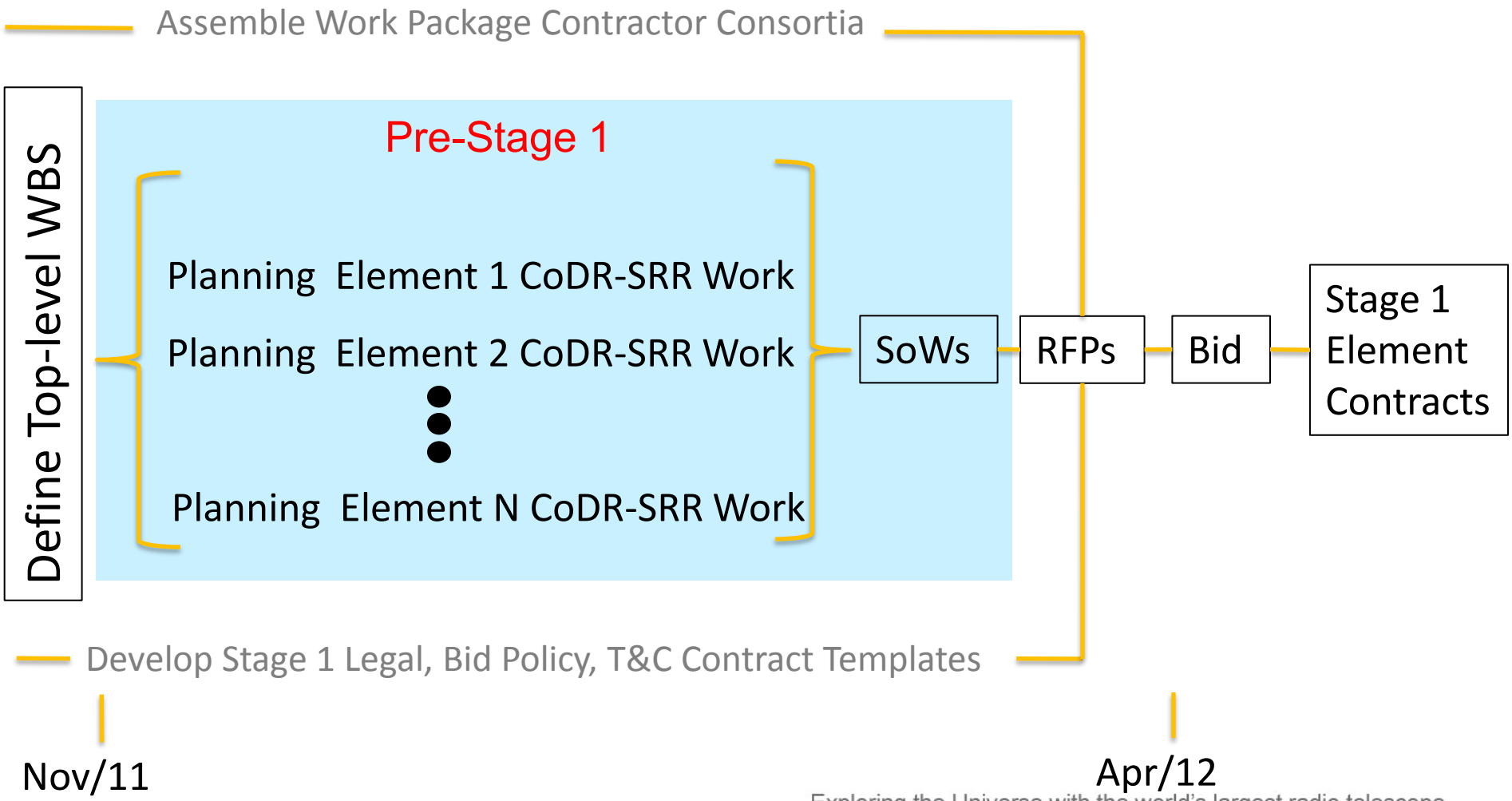
Allocated Requirements → Element Requirements, WBS Development and Design studies

Analysis of CoDRs → Element Requirements, WBS Development and Design studies

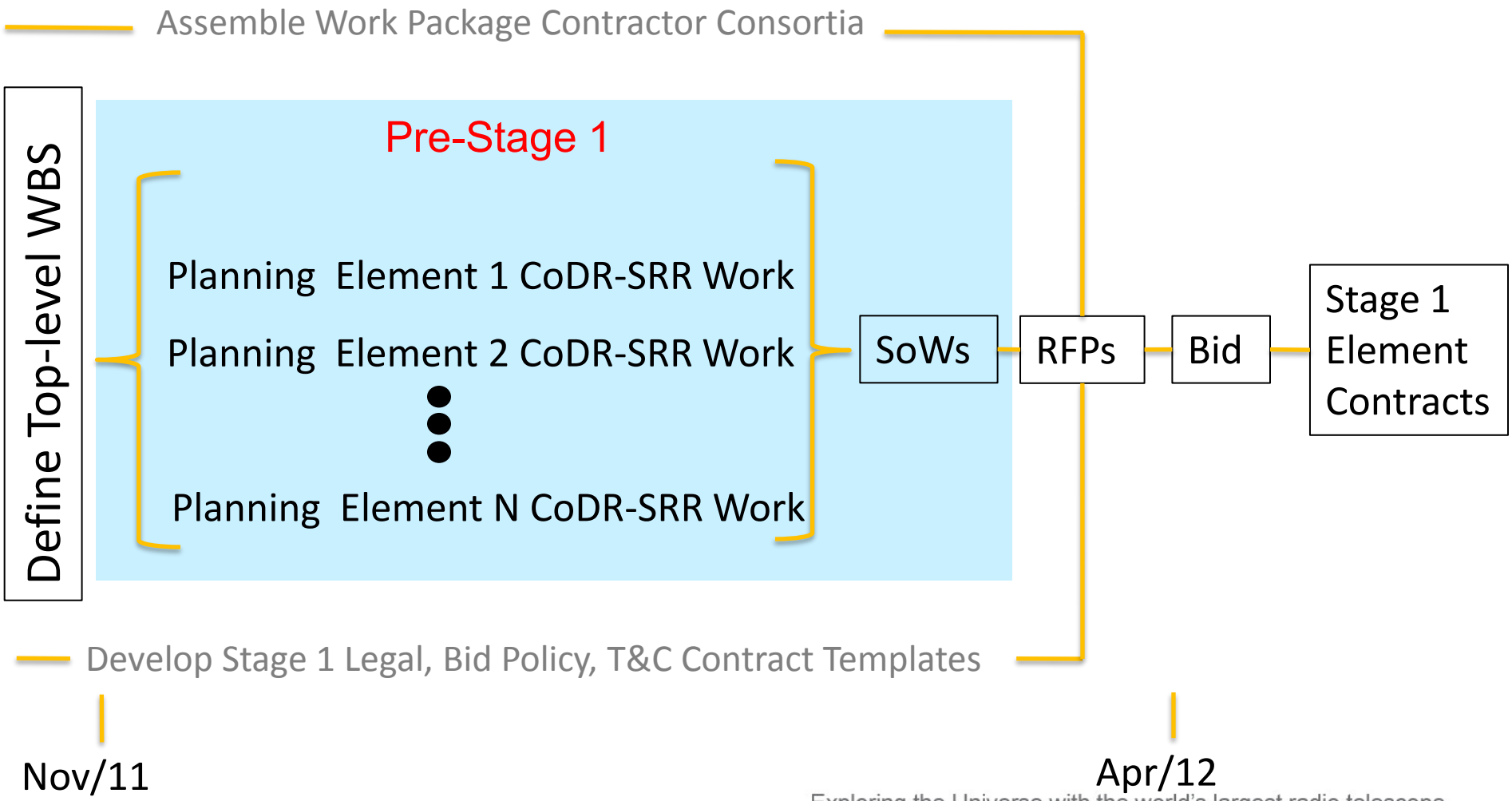
Verification Work → Element Requirements, WBS Development and Design studies

→ Element SRR

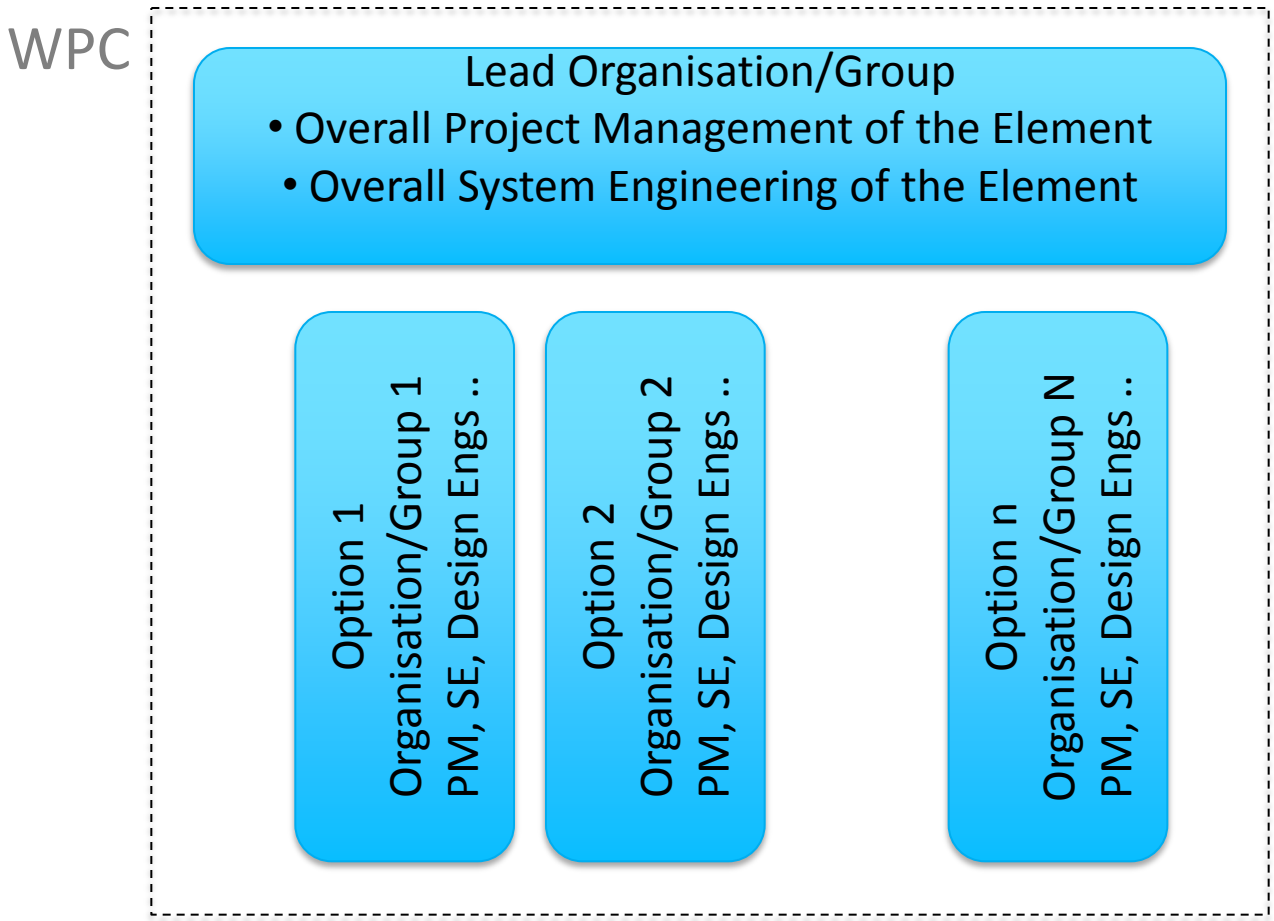
Assembling Element Level RFPs for Stage 1 Work



Assembling Element Level RFPs for Stage 1 Work



Carrying forward Options within WPC



Definition Phase

- Definition Phase
  - Through to SRR
  - Perform Requirements Analysis
  - Investigate technology options identified in the CoDR → downselect at SRR as appropriate
  - Architectural design
  - Identify and as far as possible finalise interfaces

Definition Phase Deliverables

1. Requirement specifications developed during the Definition Phase, including definition of verification tests to be performed against each of the requirements
2. First draft high level architecture description documents including:
   a. Top level block diagrams, and
   b. Descriptions of interfaces between components in the architectures
3. Updated risk register including relevant mitigation strategies
4. A requirements traceability matrix, from and to system level requirements
5. Reports outlining the findings of the investigations into candidate high level architecture options and justifications of the selected architectures to be carried forward
6. Strategy and plans for proceeding to the next phase
7. Updated cost, schedule, power and RAM estimates
8. Input as required into system level documents such as a draft health and safety plan

Identified Gaps at CoDR

1. Multi-tier model for delivery of data products is assumed
   - Tier-0 is observatory
   - Tier-1 regional science/data centres
   - Different models have been adopted for the path finders need proper analysis to make an informed decision and define observatory boundary
2. The Current DRM does not fully define S&C/SDP requirements
   - Close interaction between S&C and science teams needed in definition phase
3. S&C/M&C interaction
   - Experience to date suggests strong interaction / combination is needed – more discussion
4. Overall data model for the telescope (including persistent data) is needed in one place
   - Domains performing independent analysis of same problem from different standpoint
   - Incorporation into system-level WBS
5. Time-series processing
   - Cross WP boundary – note clear where split between S&C and Signal Processing should optimally occur
   - Same comment regarding visibility data; where is the boundary of correlator / ingest pipeline

Addressing risks

1. Programmatic risks
   - Scope of work exceeds available qualified resources
   - Mitigated by “contractors” to stage 1 and stage 2 work building strong well-resourced and suitably skilled consortia
   - SPO may need to match scope of work especially beyond definition phase to skill-set available
2. Not meeting the S&C requirements in final deliverables – e.g. we do not have a final system able to deliver highest fidelity data products
   - During definition phase develop WBS for detailed design which embodies a development model to minimise risk by ensuring delivery of a system in an test oriented mode
   - Prioritise resources to the high-risk / high priority items – management issue for consortium and SPO

Addressing risks

3. Detailed design phase
   a. Follow the structuring of the sub-system as discussed in Section 4.1 “Architecture Goals” in the Software and Computing System Overview [3]
   b. Ensure a well-defined software-engineering approach is enforced throughout the project as outlined in the Software Engineering document [7]
   c. Adopt a deploy-early approach.
   d. Develop a comprehensive test suite which is rigorously applied and required to evolve with the code base
   e. Follow a continuous, develop-deploy-test approach
   f. Follow a co-design approach to allow for algorithm/implementation design to keep in step with hardware evolution
   g. Design for successful deployment. For example until single-pass calibration algorithms are proven design for a multi-pass approach to calibration, see the Visibility Processing document [5]

Activities in definition phase

- Participate in definition of the operations plan (IDT)
- Participate in definition of the overall data model
- Further development of S&C (Science Data Processor) requirements iteratively
  - Further definition and development of software functional and performance requirements
  - Further definition and development of hardware performance requirements to meet software functional and performance requirements
  - Further definition and development of interface requirements
  - Integration and prioritisation of software and computing requirements
  - Production the traceability matrix and documentation of the requirements
    - **Documentation set giving complete analysis leading to requirements**
    - **Definition of tests**

Activities in definition phase

- Development of architecture
  - Develop candidate architecture solutions and select a preferred solution:
    - **Develop alternative architecture solutions and selection criteria**
    - **Based on the selection decision criteria, select the architecture solutions to be developed in more detail**
  - Development of selected architectures:
    - **Develop the selected architectures**
    - **Establish and maintain technical data packages**
  - Specify interfaces
  - Tests to analyse potential solutions against the decision criteria will be conducted.
  - Preliminary interface definitions for software and computing sub-system components will be defined.

Activities in definition phase

- Continued analysis, development and implementation of pipelines
- Analysis, development and implementation of streaming data solutions
- Develop software engineering plan and system engineering tasks
  - Maintain risk register
  - Strategy to proceed
  - Power
  - Other system-level requirements (safety …)