Satellite **S**warm **S**ensor **Net**work

Project Overview Presentation

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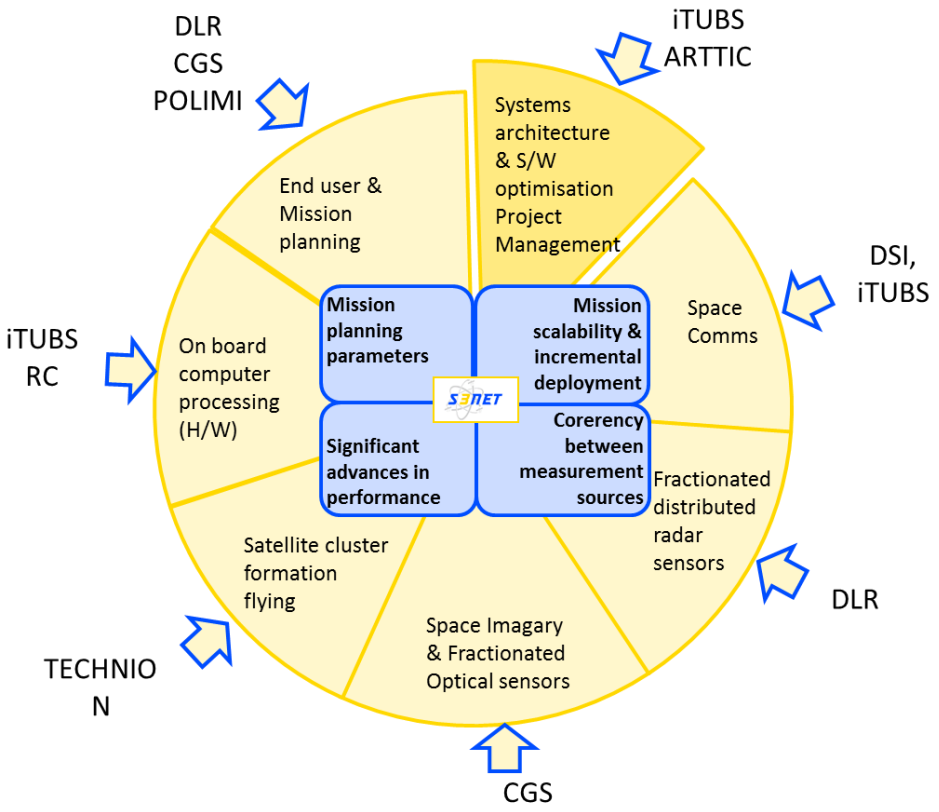
INTRODUCTION

- S3NET: Satellite Swarm Sensor Network
  - Reference missions, algorithms and effectiveness study
  - Concept computational system and performance benchmarks
  - Communication simulation and communication benchmarks
- Start date: 01/05/2016
- Duration: 30 Months
- Budget: 2,563,520 €

S3NET PARTNERS

- The S3NET Consortium is comprised of 8 partners representing 4 European countries:
  - 4 SMEs: iTUBS, ARTTIC, DSI, Ramon Chips
  - 1 industrial partner: CGS
  - 1 Research Centre: DLR
  - 2 Universities: TECHNION, POLIMI



High level objectives

Objective 1.

Develop methods for semi-autonomous long-duration maintenance of a cluster network.

Objective 2.

Find ways to share resources across the cluster network with real-time guarantees.

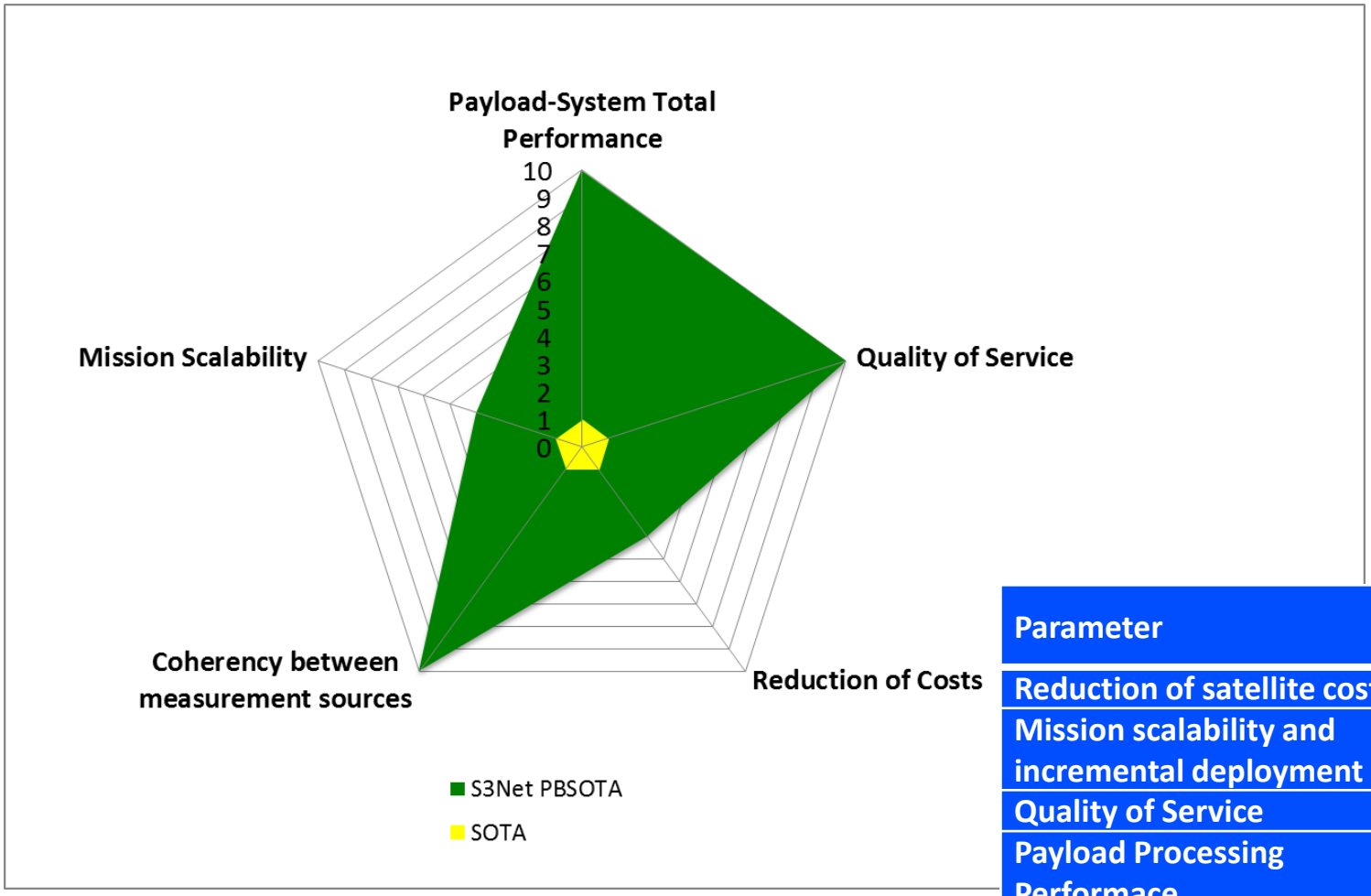
Objective 3.

Develop and standardize algorithms for autonomously reconfiguring the cluster to retain critical functionality in the face of network degradation, component failures, or space debris damage.

Objective 4.

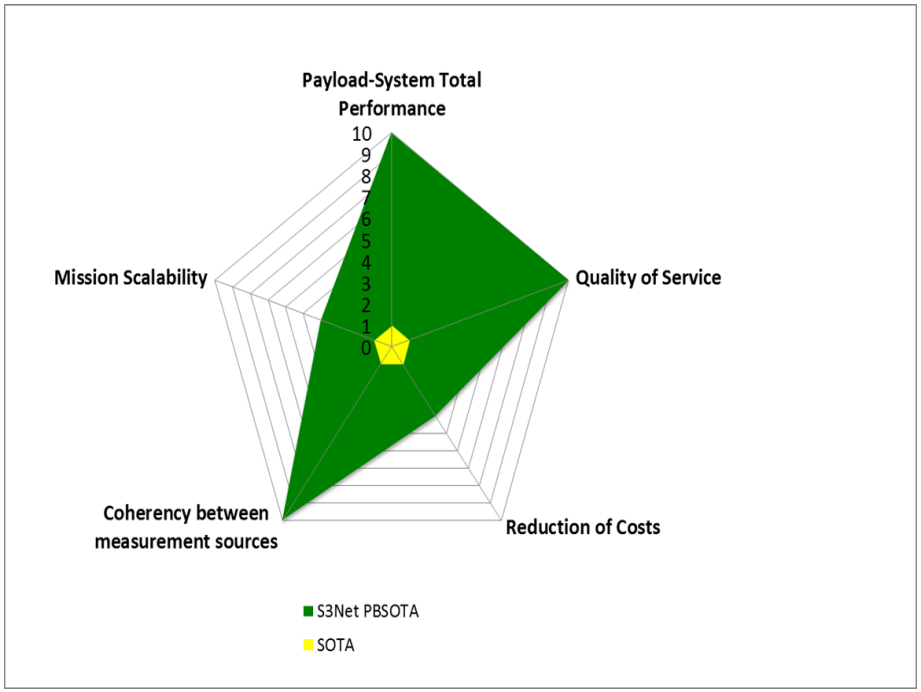
Determine how to carry out a semi-autonomous cluster scatter and gather manoeuvres to rapidly evade space debris threats.

PROJECT OBJECTIVES



Parameter	SOTA	AS2 PBSOTA
Reduction of satellite costs	1	4
Mission scalability and incremental deployment	1	4
Quality of Service	1	10
Payload Processing Performace	1	10
Coherency between measurement sources	1	10

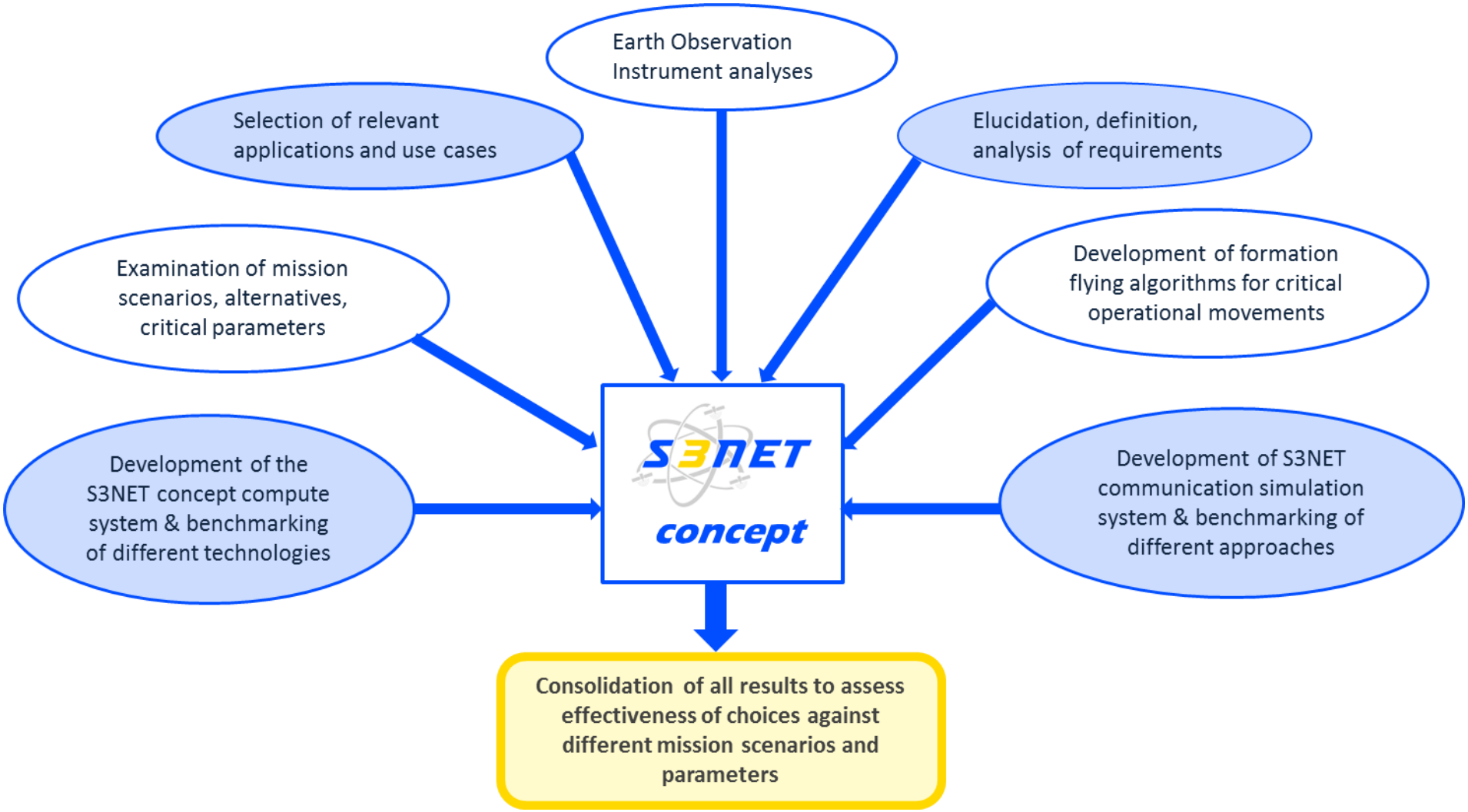
EXPECTED RESULTS



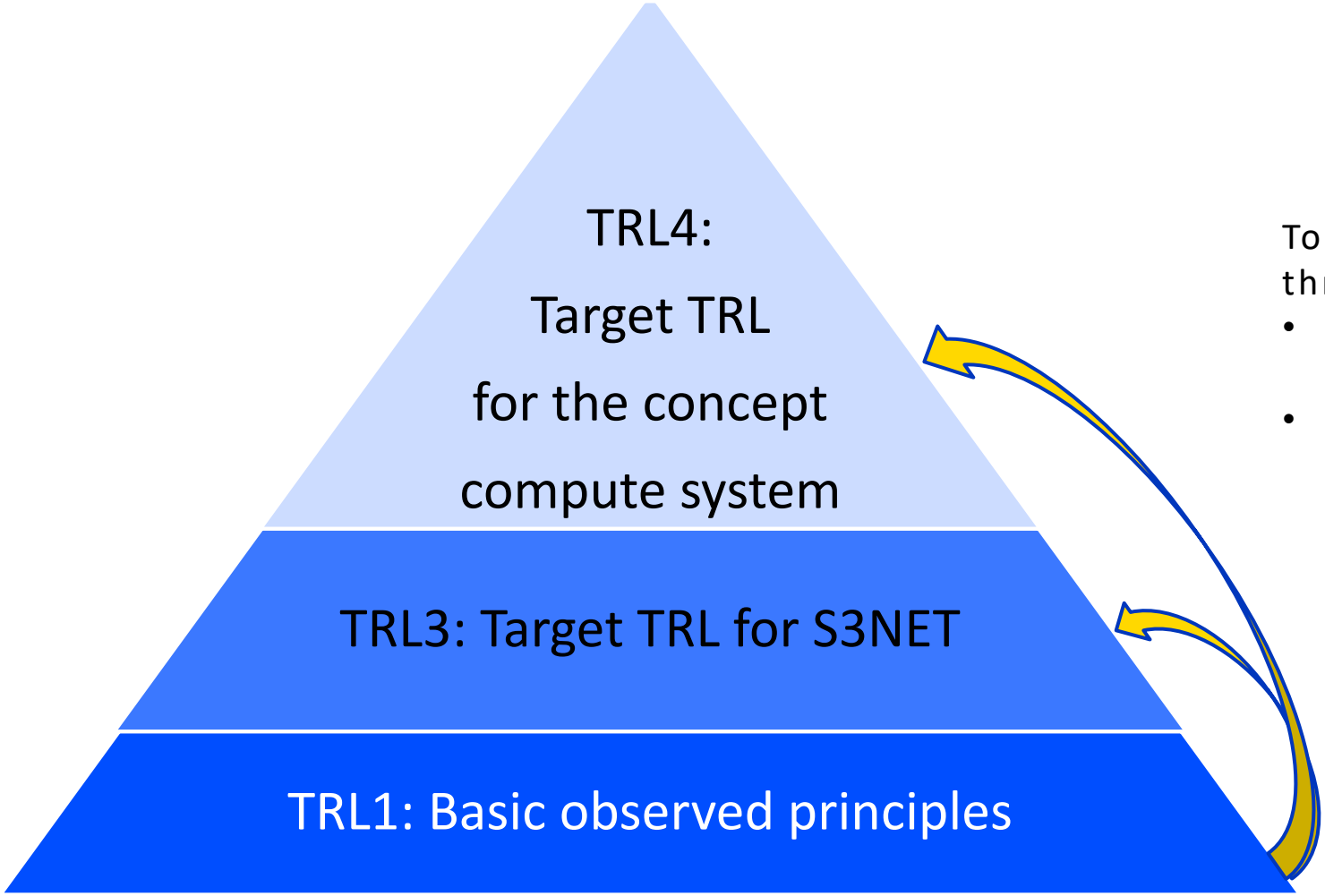
- Identified requirements and their analysis per application use case
- Results of benchmark studies
- Formation Flying algorithms
- Processing algorithms for fractionated and/or distributed earth observation applications (radar and optical)

- Assessment of cost, risk and technology for a representative subset of earth observation applications
- Effectiveness study and trade-off analysis
- Definition of an integrated roadmap for development and demonstration of enabling capabilities / technologies for each identified application
- Recommendations for the selection of the most relevant enabling technologies
- Possible mission scenarios with their advantages and limitations

S3NET CONCEPT



TECHNOLOGY READINESS LEVEL (TRL)



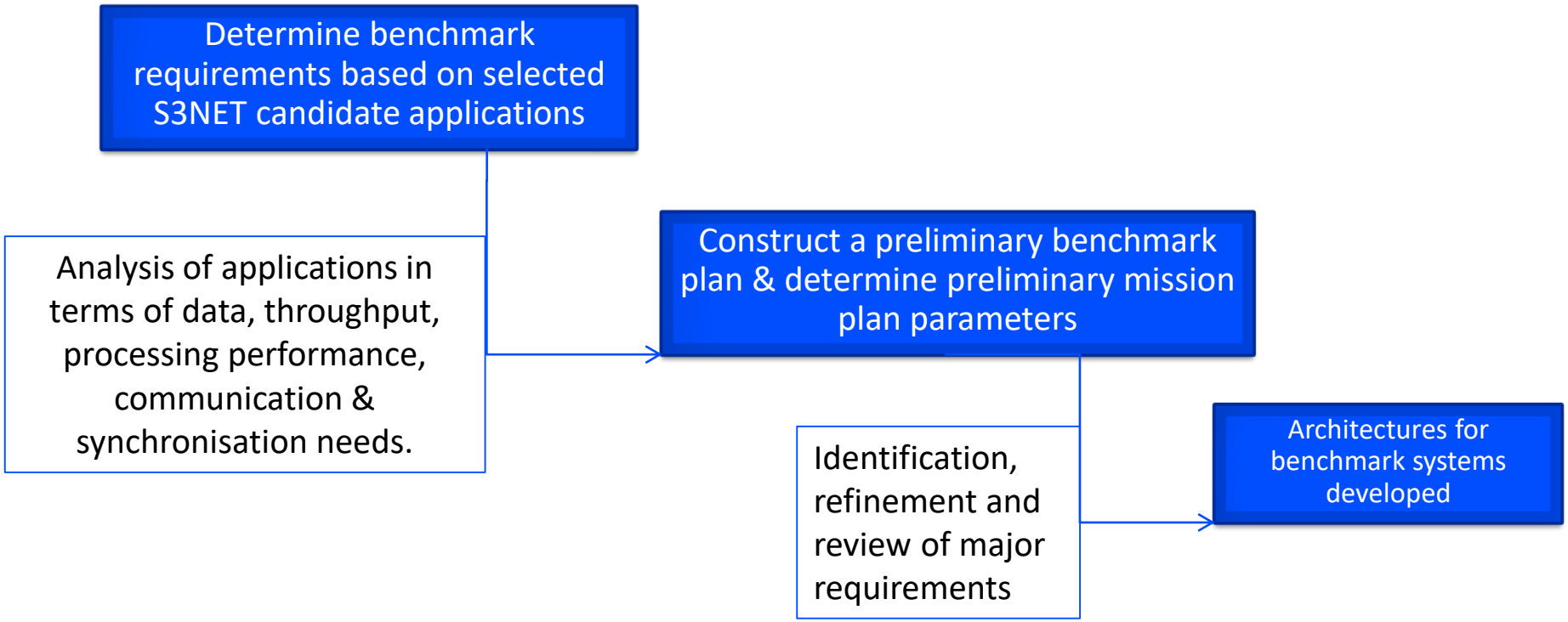
To be achieved through:

- Active research and development
- Analytical laboratory studies (WP2,WP3, WP4) to validate predictions regarding the technology.

S3NET Approach

3 major activities

- Algorithm and concept studies (WP2)
- Development of the S3NET concept compute system and computational application benchmarks (WP3)
- Development of the S3NET communication simulation system and benchmarks (WP4)



PROJECT ORGANIZATION

WP6 – Project Management (iTUBS)

- Task 6.1 Project administration (ARTTIC)
- Task 6.2 Strategic managt. and technical coordination (iTUBS)
- Task 6.3 WP technical management (iTUBS)

WP1 - Requirements and application use cases for S3NET (iTUBS)

- Task 1.1 Application requirements collection, validation and application scenarios definition (DLR)
- Task 1.2 Technical and operational requirements, use cases and validation applications (DLR)
- Task 1.3 S3NET concept compute system architecture and Scalability (RC)
- Task 1.4 S3NET Communication simulation system (DSI)

WP2 – Reference missions, algorithms and effectiveness study (CGS)

- Task 2.1 Mission design alternatives analysis (POLIMI)
- Task 2.2 Satellite formation flying (TECHNION)
- Task 2.3 Fractionated Optical Instruments based EO analysis (CGS)
- Task 2.4 Fractionated SAR Instruments based EO analysis (DLR)
- Task 2.5 Effectiveness study (CGS)

WP3 – Concept computational system and performance benchmarks (iTUBS)

- Task 3.1 S3NET concept compute system Specification (RC)
- Task 3.2 S3NET concept compute system, Test bed design and System Software (RC)
- Task 3.3 Benchmark Plan for the S3NET concept compute system (iTUBS)
- Task 3.4 Application software and performance benchmarks (iTUBS)

WP4 – Communication simulation and communication benchmarks (DSI)

- Task 4.1 S3NET Communication Simulation Specification (DSI)
- Task 4.2 Design of the S3NET Communication Simulation System (DSI)
- Task 4.3 Benchmark Plan for the S3NET Communication Simulation System (DSI)
- Task 4.4 Construct and Integrate the S3NET Communication Simulation System (DSI)
- Task 4.5 Communication Simulation and Benchmarks (DSI)

WP5 – Dissemination and exploitation (ARTTIC)

- Task 5.1 Dissemination activities (ARTTIC)
- Task 5.2 Exploitation planning & IPR management activities (CGS)
- Task 5.3 S3Net Symposium & summer school (DLR)

EXPECTED IMPACT

- **Significant advances in performance**
  - On-board high-performance and scalable computing power
  - Improvement of quality of service
  - Improvement of quality of mission control
  - Improvements in radar-based earth observations
  - Improvements of performances in future optical EO missions
  - Budgetary savings for satellite missions through life extension of satellites.
- **Greater coherency between different measurement sources**
- **Mission planning parameters**
- **Mission scalability and incremental deployment**
- **Restructuring of the space imaging value chain**
- **Employment and economic growth within Europe**
- **Moving further away from ITAR restricted products**

THANK YOU

ANY QUESTIONS?

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