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PERASPERA



Strategic Research Cluster (SRC) on Electric Propulsion

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Outline

- **H2020 Space Strategic Research Clusters : concept and composition**
 - PSA and Operational Grants
 - “Complementary” grants – Collaboration agreement
- **EPIC PSA**
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 - Main tasks
 - General work logic
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 - From the roadmap to the 2016 SRC call
 - Future activities
- **Conclusions**

H2020 Space SRC Concept and Composition

- In the frame of Horizon 2020 Work Programme 2014, two Strategic Research clusters (SRC) were initiated in the fields of:
 - *In-Space electrical propulsion and station keeping*
 - *Space Robotics Technologies*
- A multi-annual structured approach is needed to achieve a long-term objective
- SRC implementation → **system of grants connected among them:**

Programme Support Activity (PSA):

- Elaborates an SRC roadmap and implementation plan
- Provides advice to the Commission for the SRC calls documentation for Operational Grants
- Contributes to the assessment of progress and results of the Operational Grants
- Supports on the general SRC implementation

PSA is a Coordination and Support Action

Operational Grants (OG):

- Address the different technological challenges contained in the SRC roadmap
- Perform the necessary developments that, when put together, achieve the overall SRC objectives

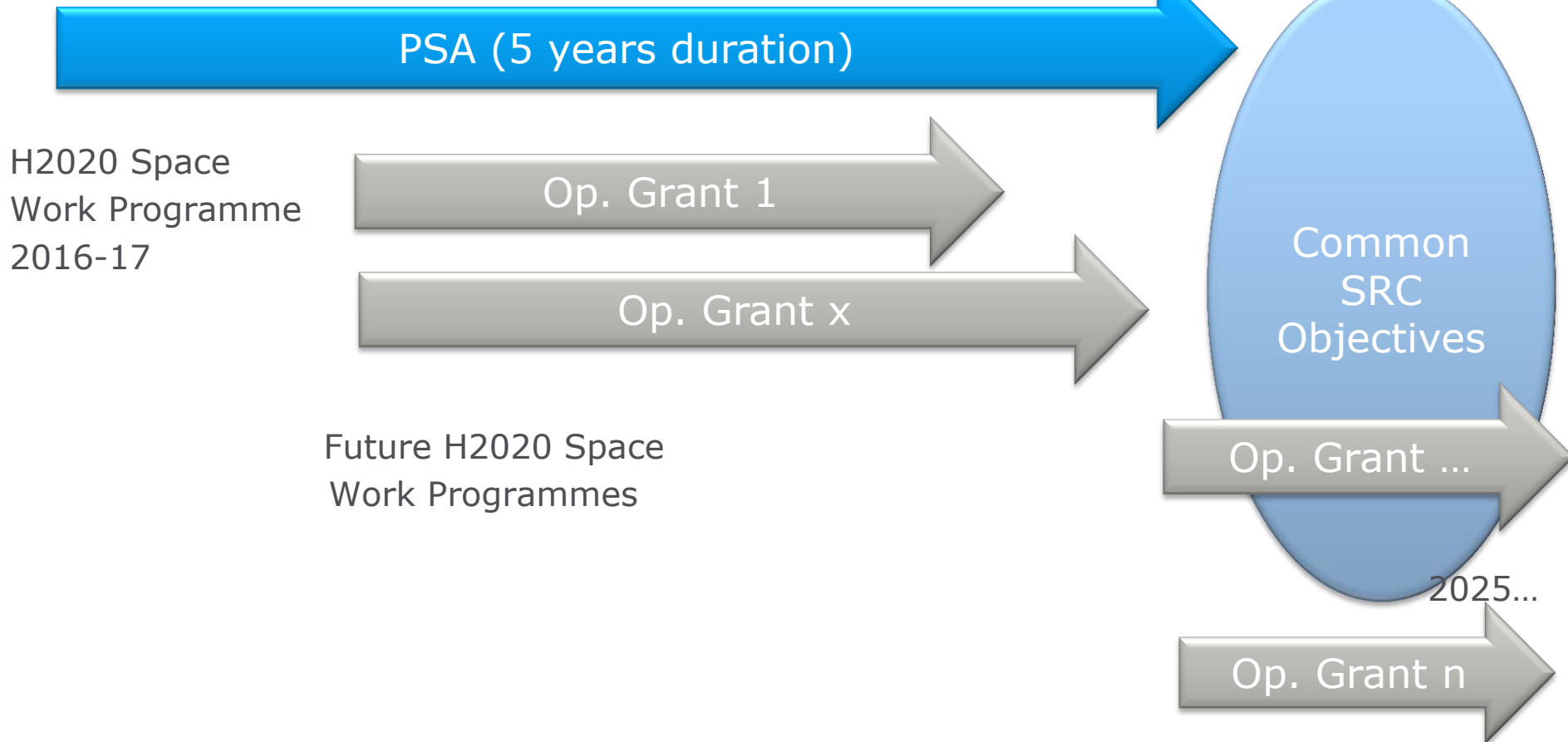
Operational Grants can be:

- Research and Innovation Grants (100%)
- Innovation Grants (70%)

H2020 Space SRC Concept and Composition

Oct. 2014

2019...



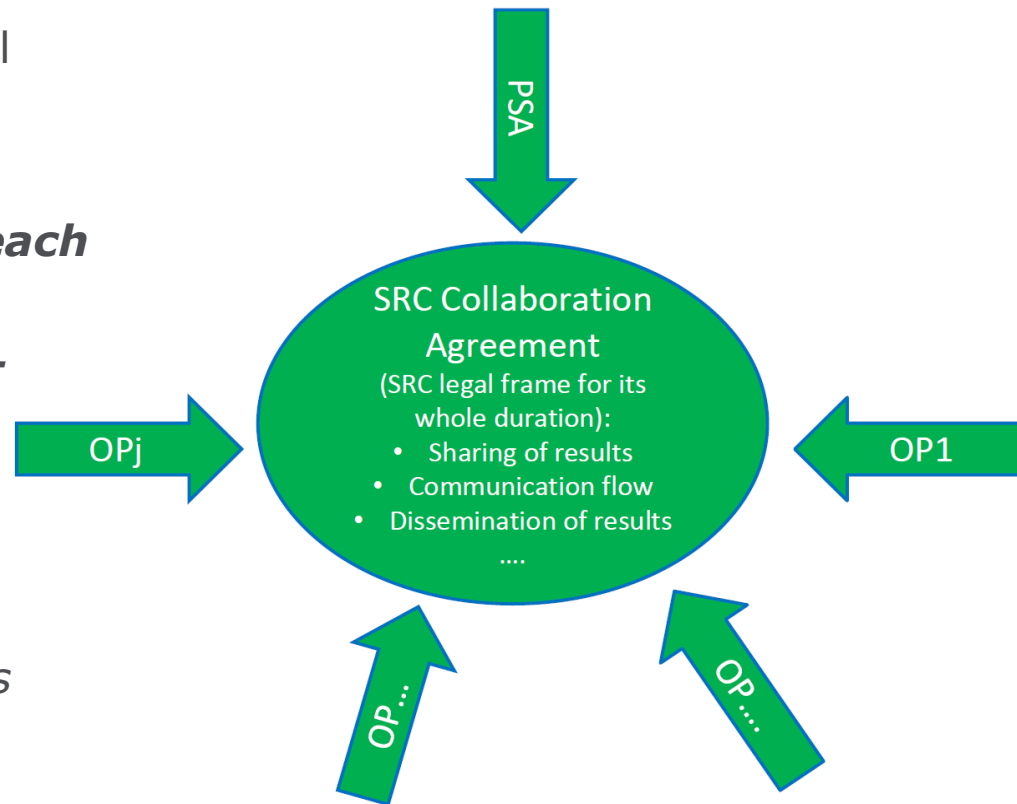
Within each SRC **the beneficiaries** of each awarded grant **will collaborate** for the **purposes of the cluster** with the beneficiaries of the other awarded grants.

The SRCs Collaboration Agreement

Work Programme text for the SRC call topic:

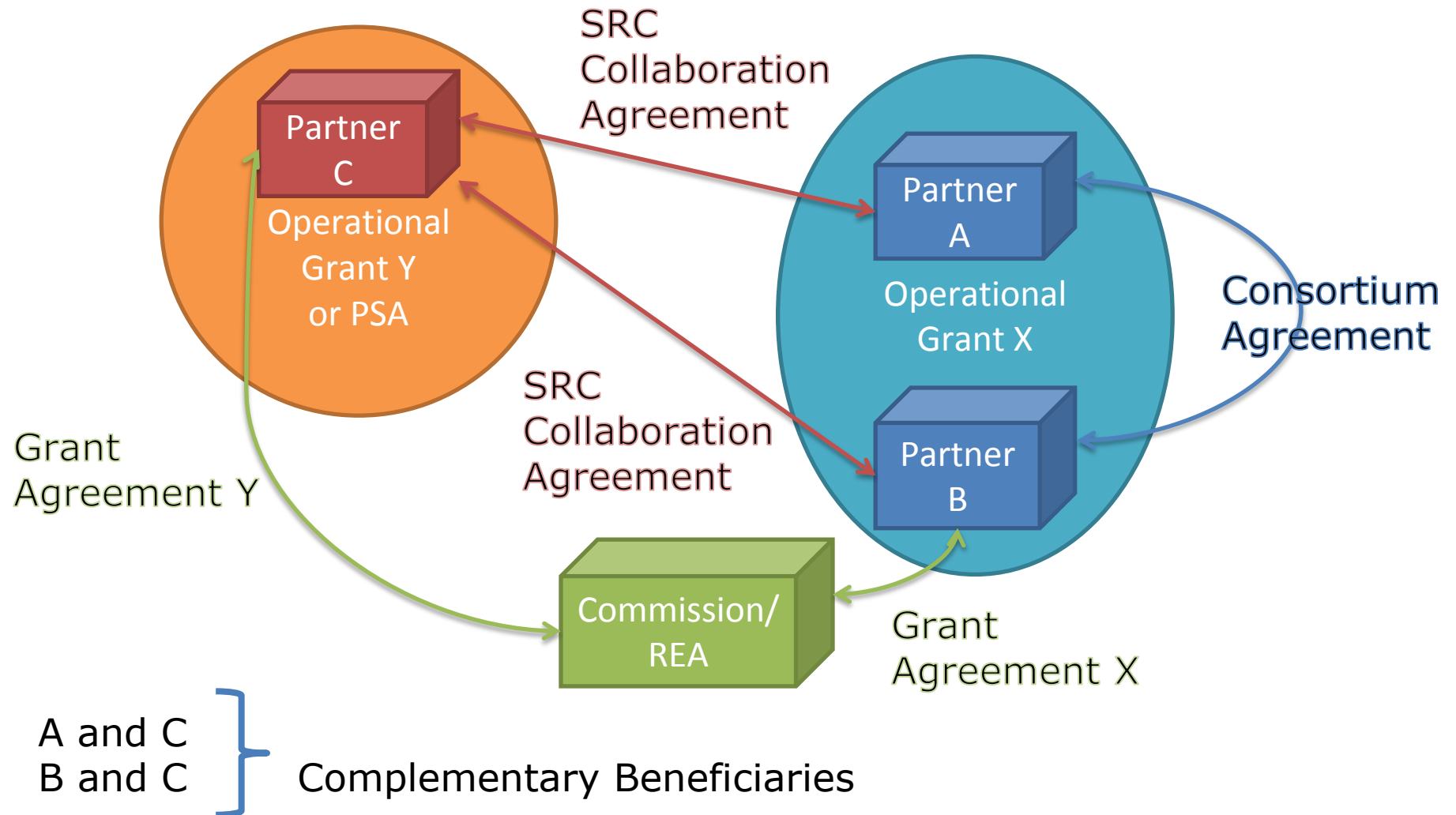
*"Grants awarded under **COMPET-3-2016-a** will be **complementary to each other** and complementary to grants awarded under sub-topic **COMPET-3-2016-b**; and vice versa.*

*In order to ensure a smooth and successful implementation of this Strategic Research Cluster (SRC), the beneficiaries of complementary grants ("complementary beneficiaries") shall conclude a written "**collaboration agreement**". The respective options of Article 2, Article 31.6 and Article 41.4 of the Model Grant Agreement will apply."*



PSA = Programme Support Activity
OP = Operational Project

Relationship between the beneficiaries of an SRC



EPIC PSA: Introduction

- **EPIC** (grant n. 640199) and PERASPERA (grant n.640026) are the PSA projects funded as part of the H2020 Space WP 2014.
- 5 years duration, starting October 2014.

- **EPIC = Electric Propulsion Innovation and Competitiveness**



- Most partners have been and are funding already through ESA or National Programmes more than substantial research and development in technology and space missions involving electric propulsion.
- All partners are already since many years harmonising (together with all ESA member states) R&D in Technology through the European **Technology Harmonisation Advisory Group (THAG)** → roadmapping and consultation exercises.
- Knowledge, experience and expertise to support the H2020 SRCs.

EPIC PSA: Introduction

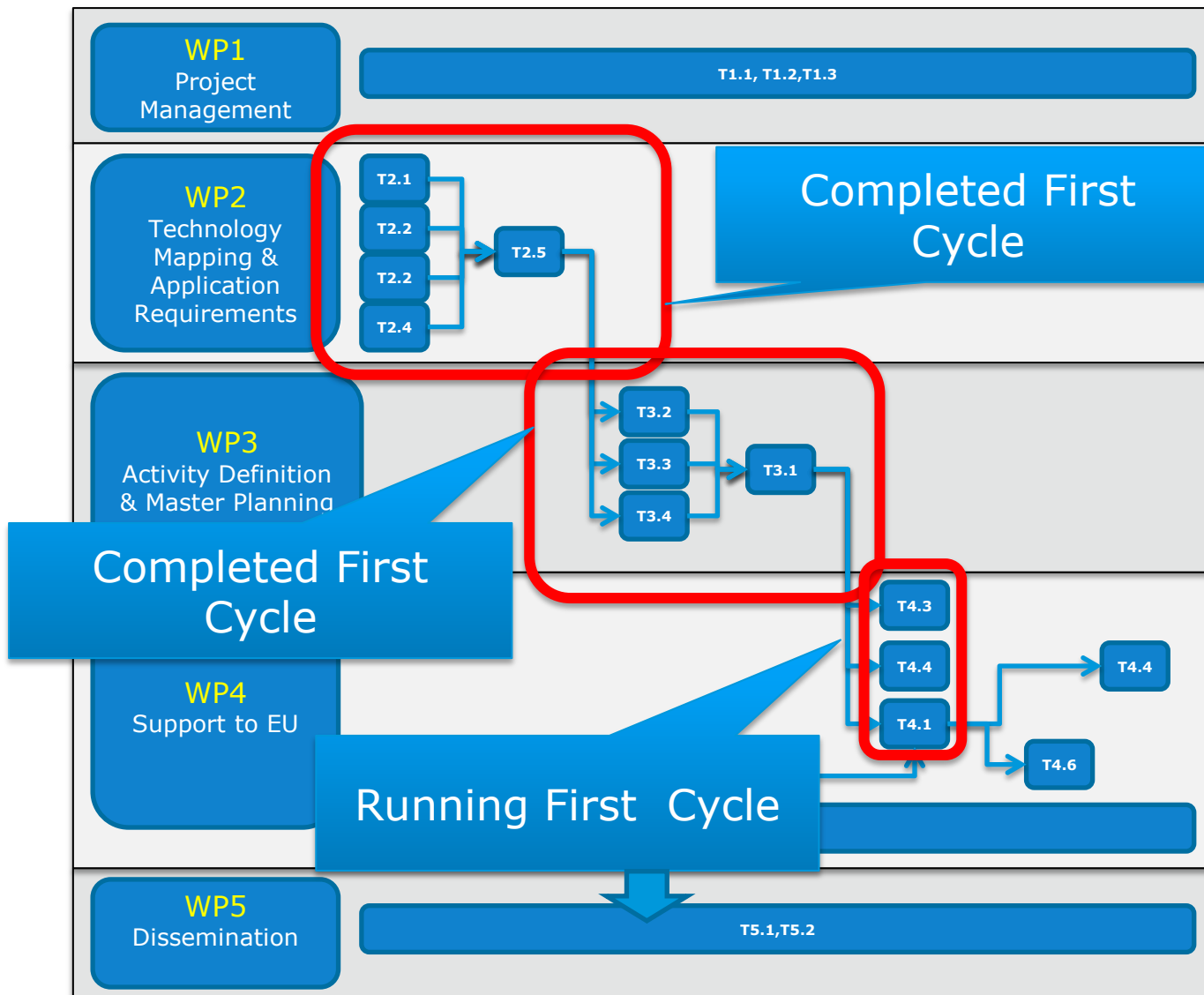
- **SRCs challenges:**
 - **EPIC** → to enable major advances in Electric Propulsion (EP) for in-space operations and transportation, in order **to contribute to guarantee the leadership through competitiveness and non-dependence of European capabilities** in electric propulsion at world level within the 2020-2030 timeframe, always in coherence with the existing and planned developments at national, commercial and ESA level.

EPIC PSA: main tasks

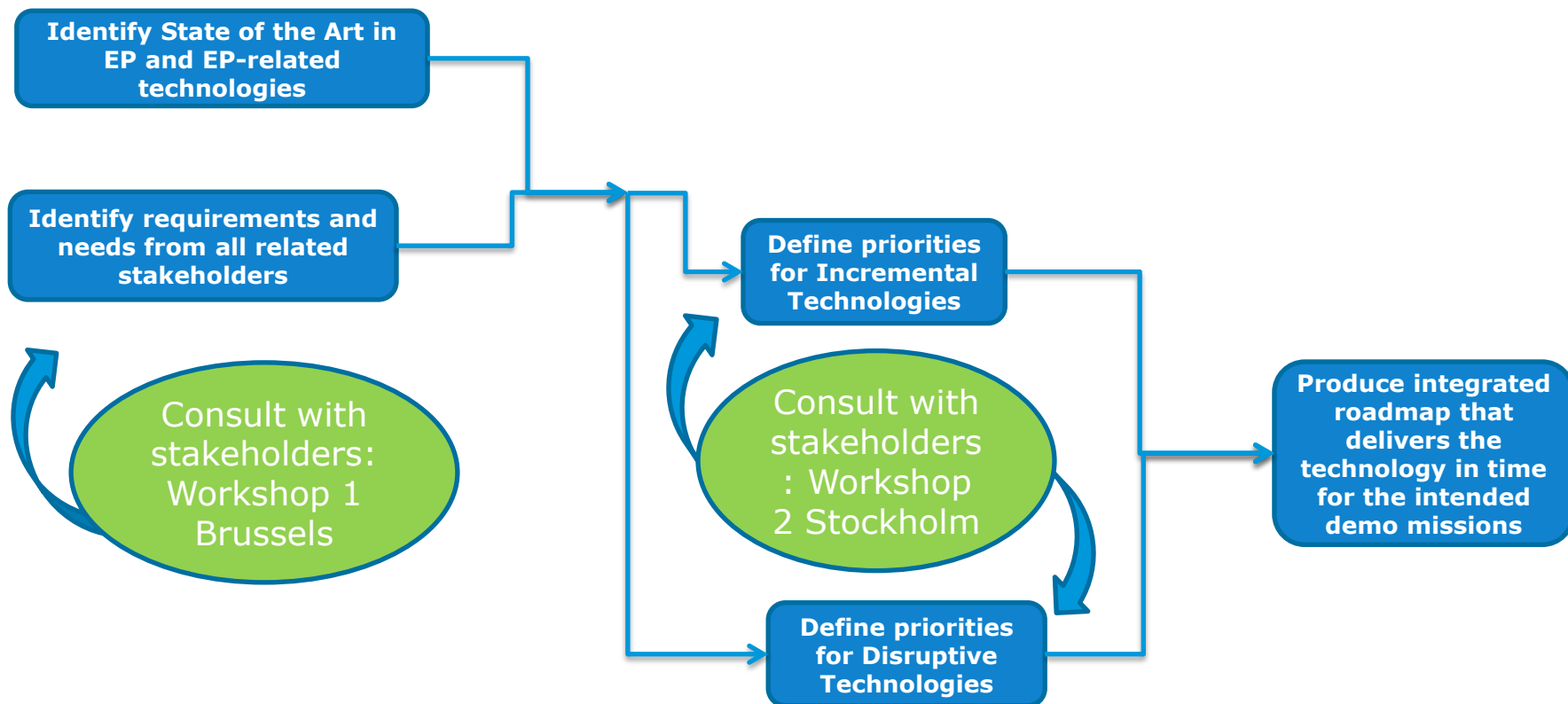
EPIC PSA is producing number of deliverables that will allow, mainly:

- Evaluation on the state of the art and needs of stakeholders
- Definition and refinement of SRC roadmap and master plan for implementation
- Risk management
- Definition of the collaboration aspects between SRC grants, including the PSA
- Assessment of the progress and results of the Operational Grants, in the context of the SRC objectives
- Dissemination and education activities

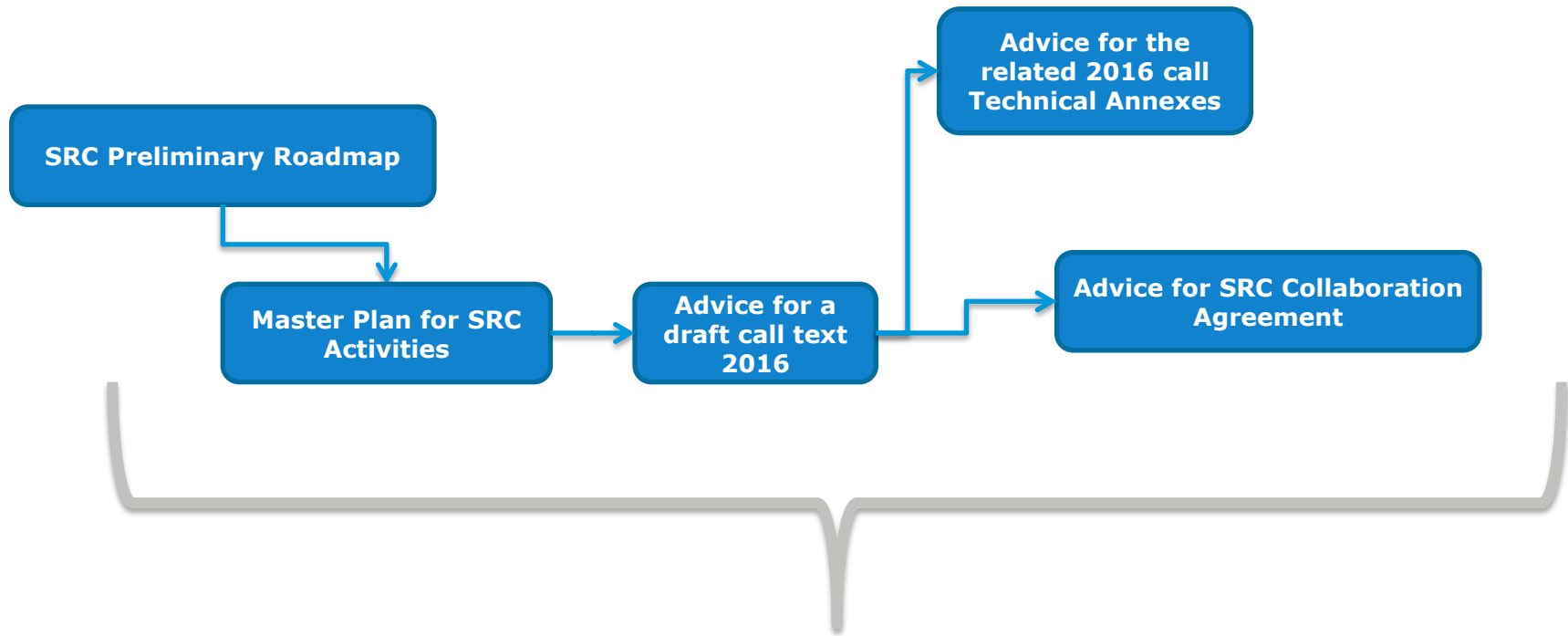
EPIC PSA : general work logic



EPIC: the SRC roadmap work logic



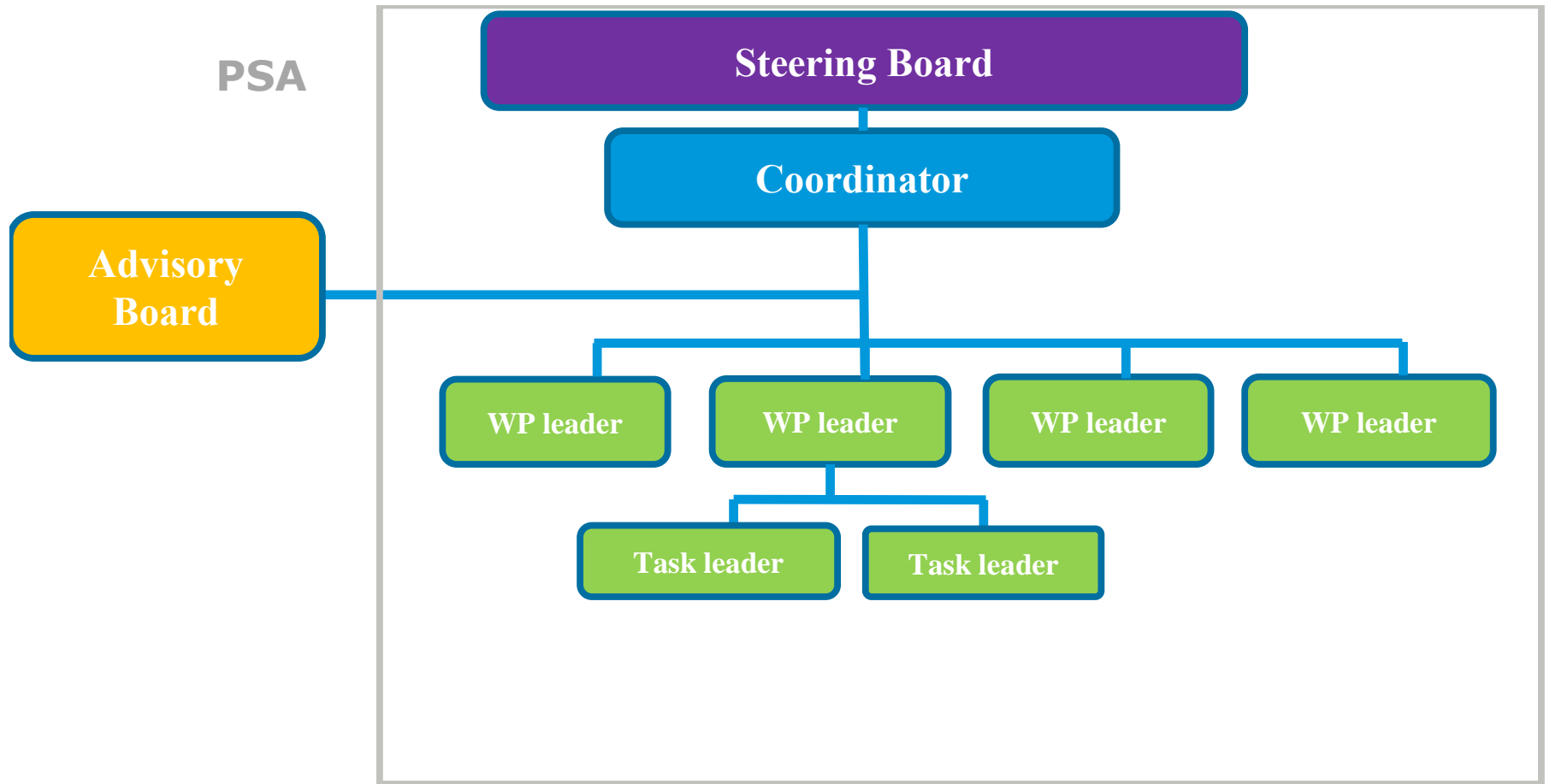
EPIC : from the SRC roadmap to the 2016 SRC call



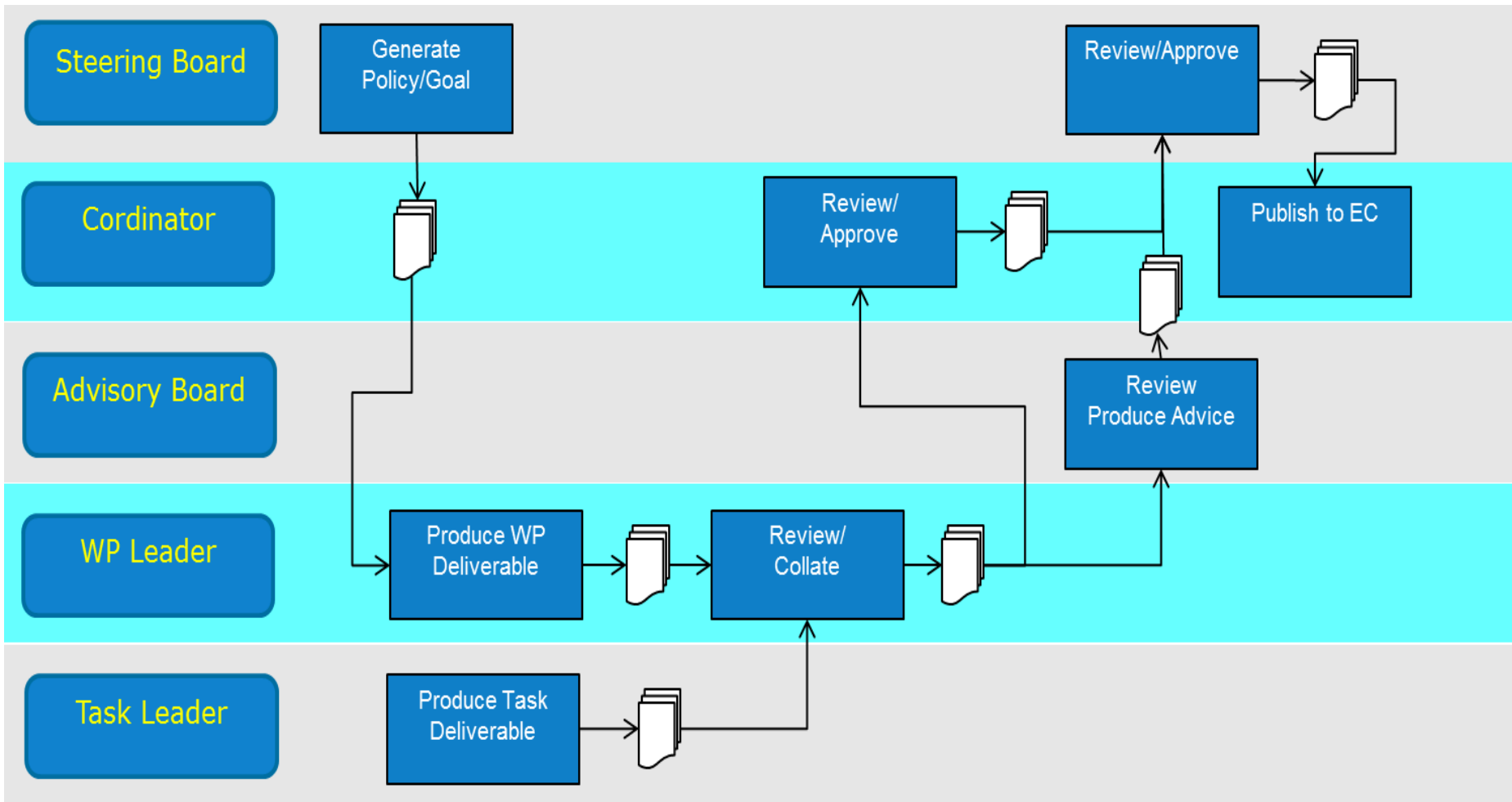
European Commission 2016 SRC call + call related documents

This process, together with a continuous monitoring of the state of the art and the assessment of the progress of the first SRC op. grants (2016 call), will be repeated for the subsequent SRC phases.

EPIC PSA GOVERNANCE STRUCTURE



PSA GOVERNANCE – DELIVERABLE WORK PROCESS



2016 – 2019 PSAs Work

1. Assessment of the progress and results of the Operational Grants, in the context of the SRC objectives
2. Review the SRC Roadmap and update.
3. Preparation of future SRC call topics in H2020 (EPIC: disruptive 2019; incremental 2020 WP) and advice to Commission on implementation.

Continuous SRC progress monitoring, dissemination, risk management, calls preparation...

Long-term SRC Roadmap

To promote European innovation and competitiveness in Electric Propulsion and its use, the SRC roadmap addresses two lines of developments:

INCREMENTAL LINE

- To enable incremental advances in already known technologies, currently under development, in order to **increase substantially their TRL** and allow them in-orbit in the **short-to-medium timeframe**
- Addressing the whole Electric Propulsion (EP) system
- Physics of the technology are well understood

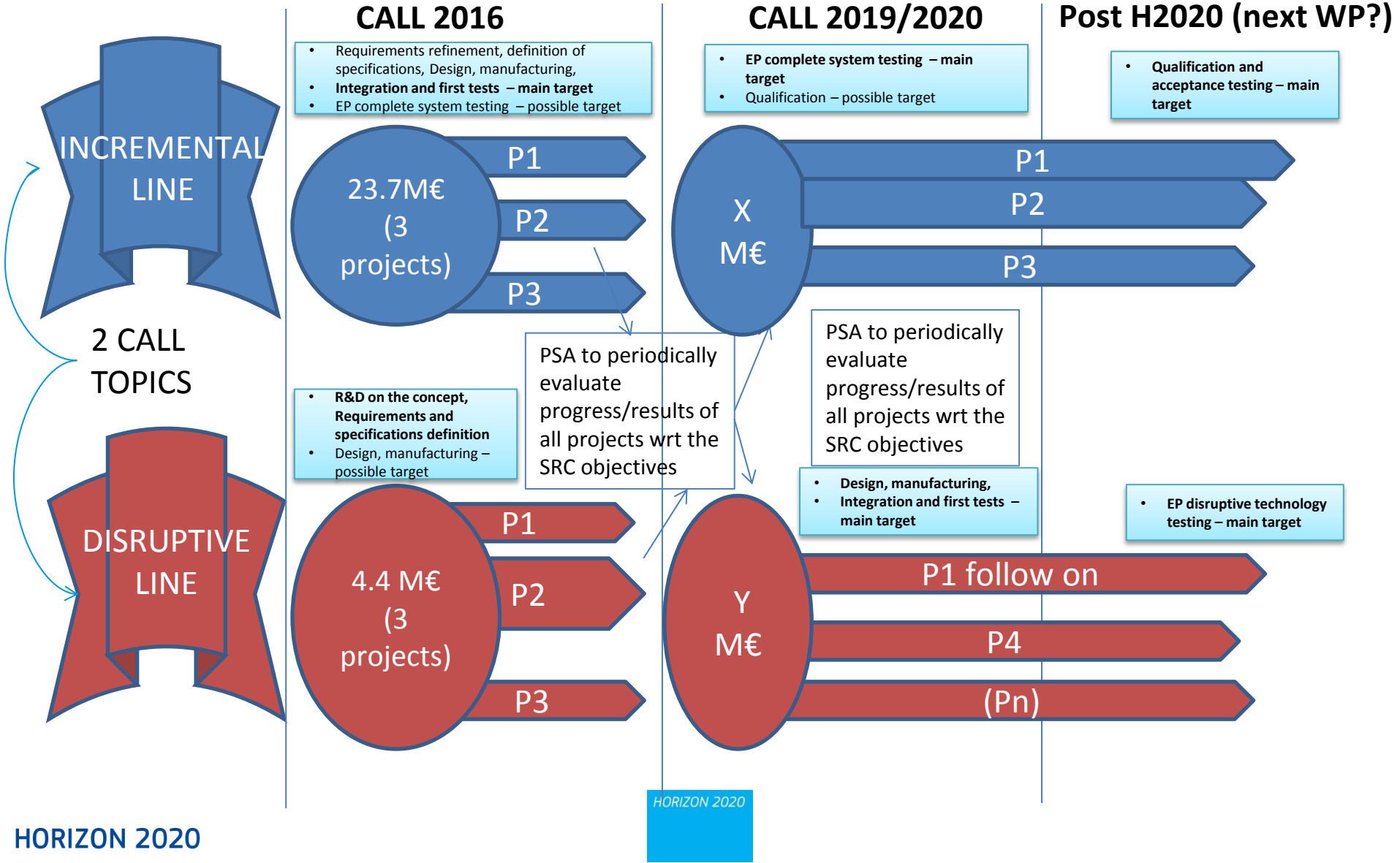


Hall Effect Thruster (HET), Gridded Ion Engines (GIE), HEMP thruster-based EP systems

DISRUPTIVE LINE

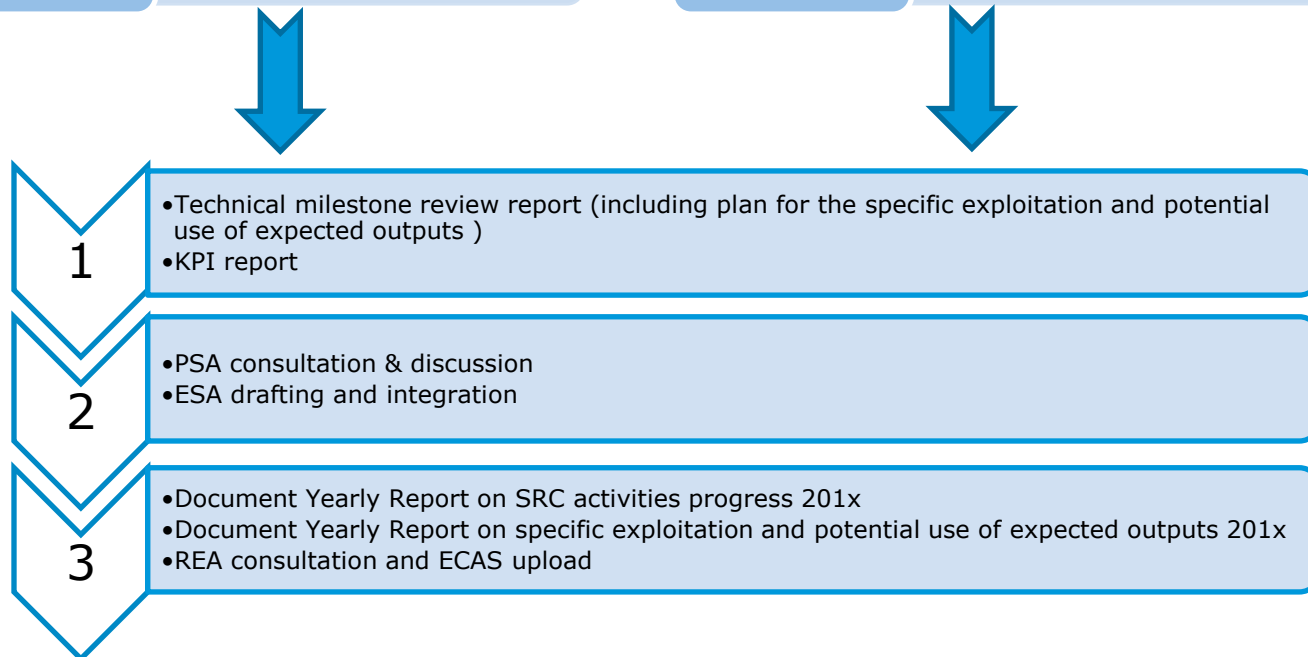
- To promote the **Research, Technology and Development (RTD)** of very promising and potentially disruptive concepts in the field of EP, in order to allow the increase of the **currently low TRL** of breakthrough concepts which in the **long term** could change the EP landscape.
- Addressing mainly disruptive thruster technologies and EP-system transversal technology concept
- Physics of the technology are not well understood

Long-term SRC roadmap (2/2)



Monitoring and Analysis of SRC Progress

- Selected PSA members per project:



Monitoring and Analysis of SRC Progress

- **PSA Assessment Processes (running in parallel), to be repeated yearly:**

1.

KPI template filled in by OG (available to all WP4 Members)

KPI report filled in by EPIC PSA

Findings reported by EPIC to COM/REA in "Yearly Report on SRC activities progress 201x"

2.

OG Deliverables available to EPIC (selected members per project)

PSA Attendance to Technical Milestone Review

EPIC Future Workshops



24-26 October
2017/ Madrid
EPIC Workshop

- progress of PSA and SRC
- **presentation of 2016 OGs**

3Q 2018/ London
EPIC Workshop

- progress of PSA
- **progress of 2016 OGs**
- Consultation on update of EPIC Roadmap (open to all interested stakeholders)

Sept/Oct. 2019/
ESTEC EPIC
Workshop

- Final presentation of PSA
- **results of 2016 OGs**
- Consolidated 2nd Issue EPIC Roadmap

Conclusions

- ❑ The SRC is a system of connected grants with common high level objectives, to be reached when the results of all the grants are put together.
- ❑ PSA is a Programme Support Activity, producing the SRC roadmap to be implemented through the Operational Grants.
- ❑ All grants within one SRC are “complementary” grants to all the other SRC grants, including the PSA, and as such their interactions are regulated through the SRC Collaboration Agreement.
- ❑ The EPIC and PERASPERA PSAs have, since October 2014 worked on the definition of the SRCs roadmap and 2016 call documents for Operational grants
- ❑ The PSAs will follow the SRC implementation, monitor the state of the art and redefine the roadmap and subsequent SRC phases (calls) as necessary.
- ❑ The monitoring of the 6 SRCs, the risk analysis, the plan for the exploitation of the results of the SRCs, the dissemination and the preparation of the next calls will be the main activity of the period 2017-2019.
- ❑ An extension of the work of the PSA for the second phase has been requested.