

# **SOLARIS:** Technology Plan



SOLARIS Research & Technology Day

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# Proposed Technology Development Activities



	Activity Title	Budget (k€)
<b>Solar Generation</b>		
	Development of low cost, high efficiency multi-junction space solar cells	2,500
	Development of large scale, lightweight, compact, efficient, cost effective, space compatible solar generators	1,000
	Preliminary development of very large (square kilometre scale) modular solar arrays with solar concentrators	500
	Adaptation of terrestrial-based cell technologies for use in SBSP applications	500
	Study of strategies to develop multiple scalable sources of solar cells and solar arrays	250
To be updated further	Novel Architecture and components for high-voltage, high power management and distribution for Space-Based Solar Power satellites	4,000
<b>Total</b>		<b>8750</b>

Correction

	Activity Title	Budget (k€)
<b>RF generation and accurate beam forming</b>		
	Antenna for MW demonstrator of Wireless Power Transmission	15,000
To be updated further	Antenna for GW Wireless Power Transmission	10,000
To be updated further	High efficiency Solid State DC to microwave converting device demonstrator	2,500
To be updated further	Vacuum technology-based DC to microwave converting device demonstrator	2,500
<b>Total</b>		<b>30,000</b>

[POTENTIAL ACTIVITIES FOR THE SPACE BASED SOLAR POWER SPECIFIC AREA IN GSTP ELEMENT 1, ESA-TECSF-LI-2022-004007, 19 Dec 2022](#)

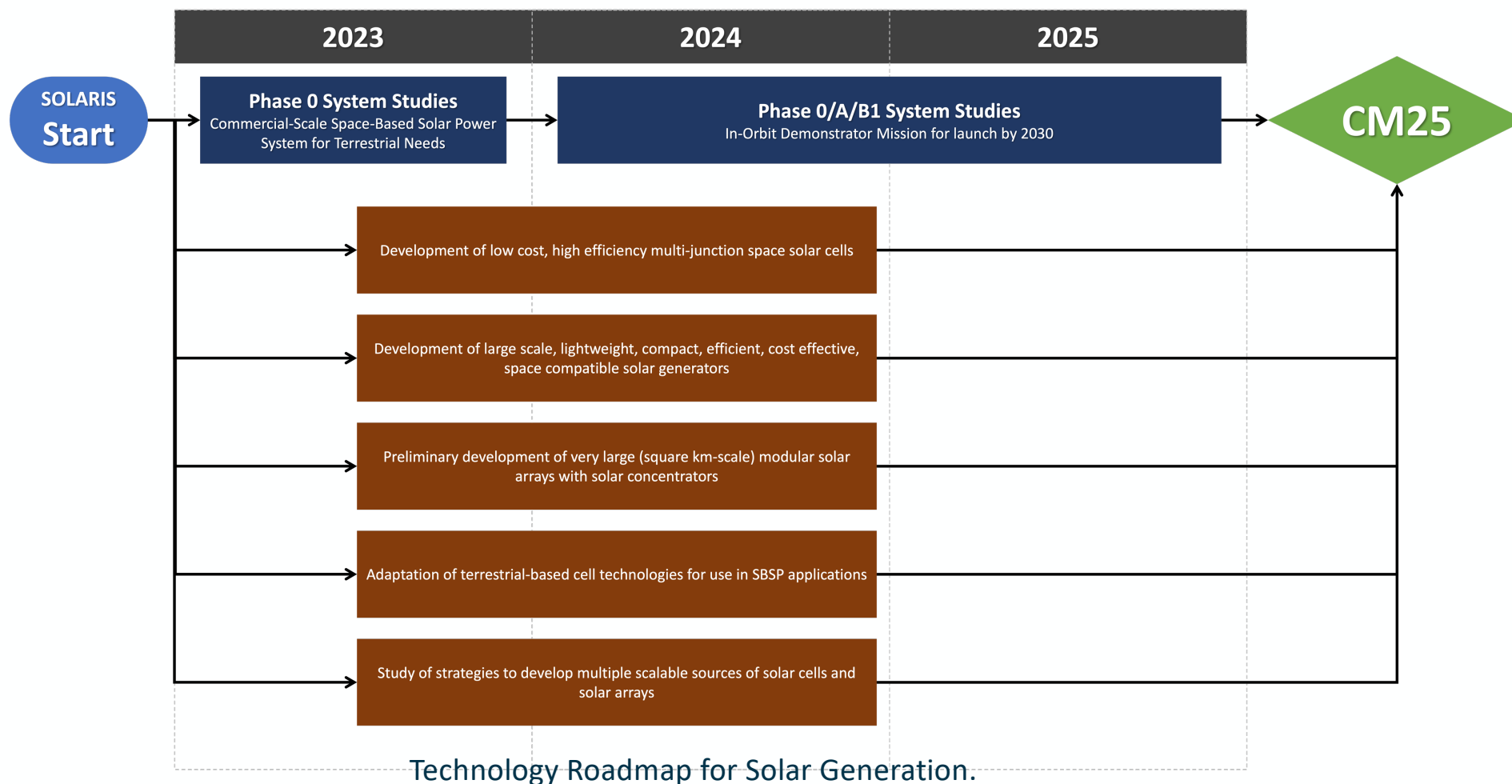
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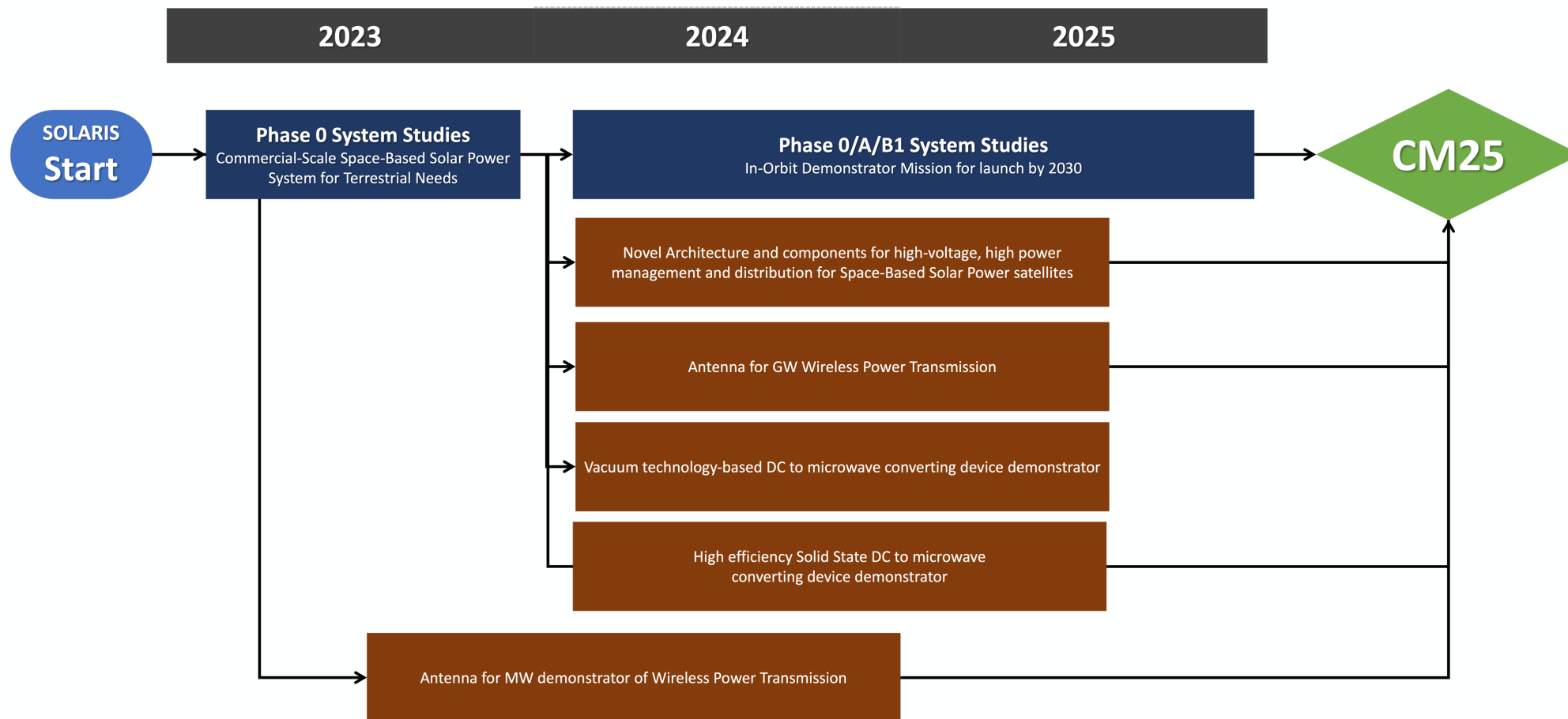
	Activity Title	Budget (k€)
<b>In-orbit Robotic Assembly, Manufacturing &amp; Maintenance of Very Large Structures</b>		
	Robotics Interfaces and tooling for SBSP Engineering (RISE)	4,000
	End to End Humanoid for Automation Non Compliances and Exceptions in SBSP (ENHANCES)	6,000
	Classes of Robotics Expert Workers for SBSP (CREWS)	5,000
<b>Total</b>		<b>15,000</b>

	Activity Title	Budget (k€)
<b>In-orbit Robotic Assembly, Manufacturing &amp; Maintenance of Very Large Structures</b>		
To be updated further	Development of on-orbit manufacturing technologies for very large SBSP spacecraft structures	7,000
To be updated further	Development of process verification and part validation approaches for on-orbit manufactured parts in very large SBSP spacecraft structures	3,000
To be updated further	Development of enabling technologies for on-orbit servicing of solar power satellites	5,000
To be updated further	Simulation software for modelling structure/AOCS coupling	300
To be updated further	Structural modelling of very large space structures	500
To be updated further	High load capacity coupling mechanisms	1,500
<b>Total</b>		<b>17,300</b>

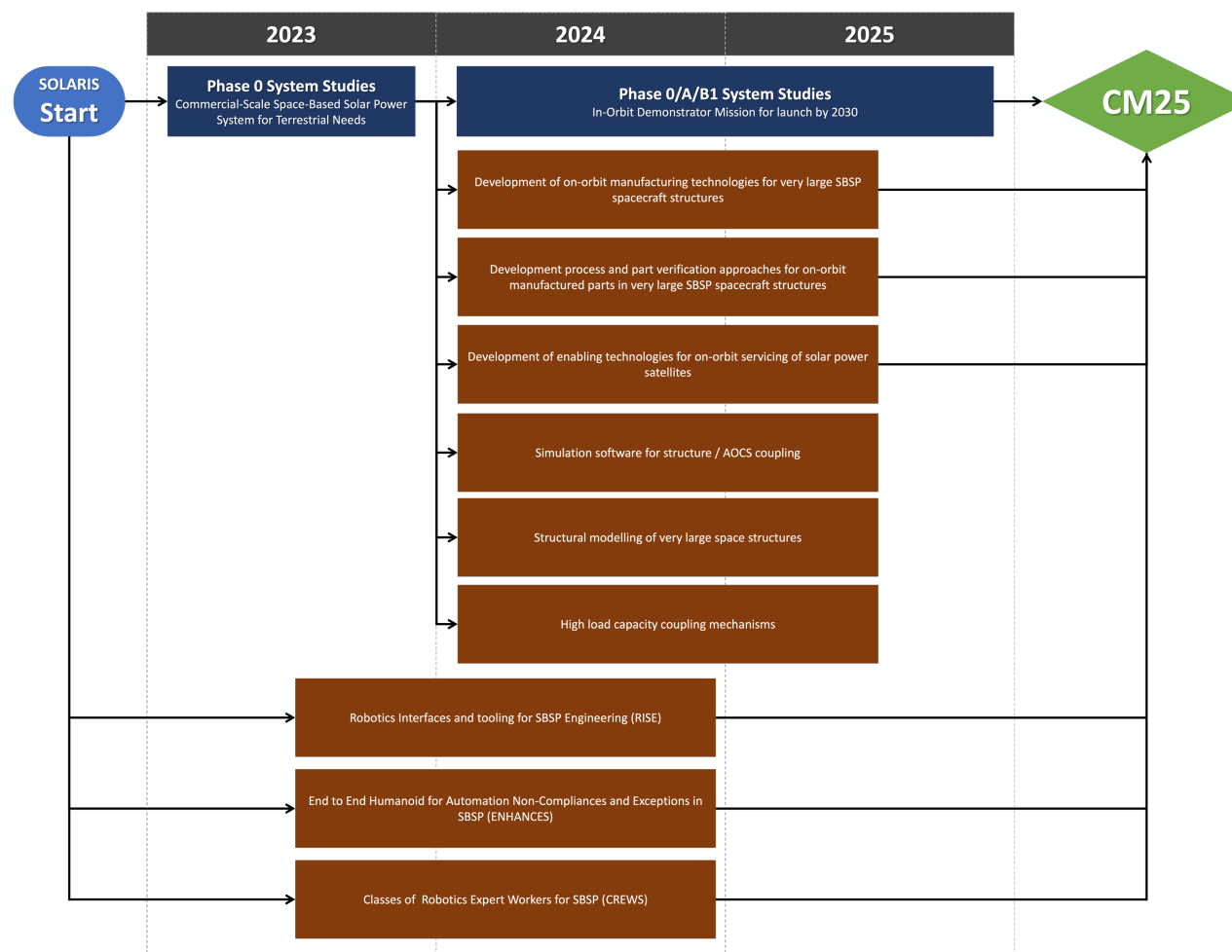


→ THE EUROPEAN SPACE AGENCY





## Technology Roadmap for Power Management and Distribution, and RF Generation and Accurate Beam Forming



## Technology Roadmap for In-orbit Robotic Assembly, Manufacturing and Maintenance



Please contact your  
National Delegations  
to express your  
priorities for  
SOLARIS activities



# Complementary activities by the EIC



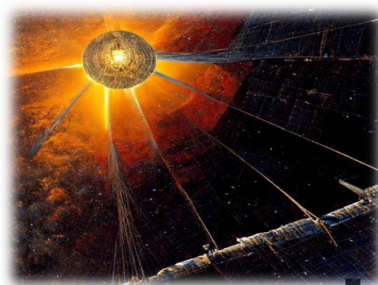
## In-space solar energy harvesting for innovative space applications - Part I



### Goal

The development of concepts and technologies required for in-space energy harvesting and transmission, and of novel propulsion technologies that will use such harvested energy.

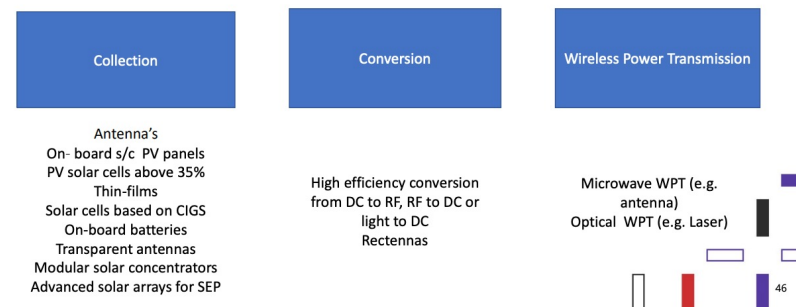
- Scalable solutions for in-orbit efficient solar energy collection and storage
- Conversion of DC-to – RF of the harvested energy in a form appropriate for transmission at long distances in empty space
- Efficient Wireless Power Transmission (WPT) of the transformed energy between in-space s/c and various stations in orbit
- Innovative green propulsion solutions for in-space mobility, resulting into low cost or eco-friendly innovative concepts



## Category I - In-space solar energy harvesting for innovative space applications



### Collection, conversion and transmission (CCT)



## Pathfinder calls 2023 – Summary table



	Pathfinder Open	Pathfinder Challenges
Total budget	€179.5 million	€163.5 million
Proposals (indicative)	Up to €3 million	Up to €4 million
Funding rate	100% of eligible costs	100% of eligible costs
Opening	10 January 2023	20 June 2023
Deadline	7 March 2023 at 17.00 CET	18 October 2023 at 17.00 CET
Length of proposal	17-page proposal (part B)	25-page proposal (part B)
Applicants	<b>Consortia</b> min. 3 partners from 3 different Member States / Associated Countries (of which at least 1 partner in a Member State)	<b>Consortia:</b> <ul style="list-style-type: none"> <li>• If 2 partners: from different MS/AC,</li> <li>• Min 3 partners from 3 different MS/AC (of which at least 1 partner in a MS)</li> </ul> <b>Single legal entities in a MS/AC</b>

# SOLARIS Potential for additional activities

- **With increased funding, additional activities would include:**
  1. Increase in investments of all top priority areas by widening industrial participation and investigation of different technical solutions (parallel studies & breadboarding)
  2. Investment in additional important areas to be de-risked:
    - AOCS/GNC of large scale structures
    - High-energy thermal management
    - Spacecraft AIT for in-orbit assembly structures
    - Mitigation of orbital debris generation
  3. Advance Phase B2 activities for precursor demonstrator mission
  4. Early In-orbit technology demonstrators
  5. TRL raising to 6 for highest risk technologies