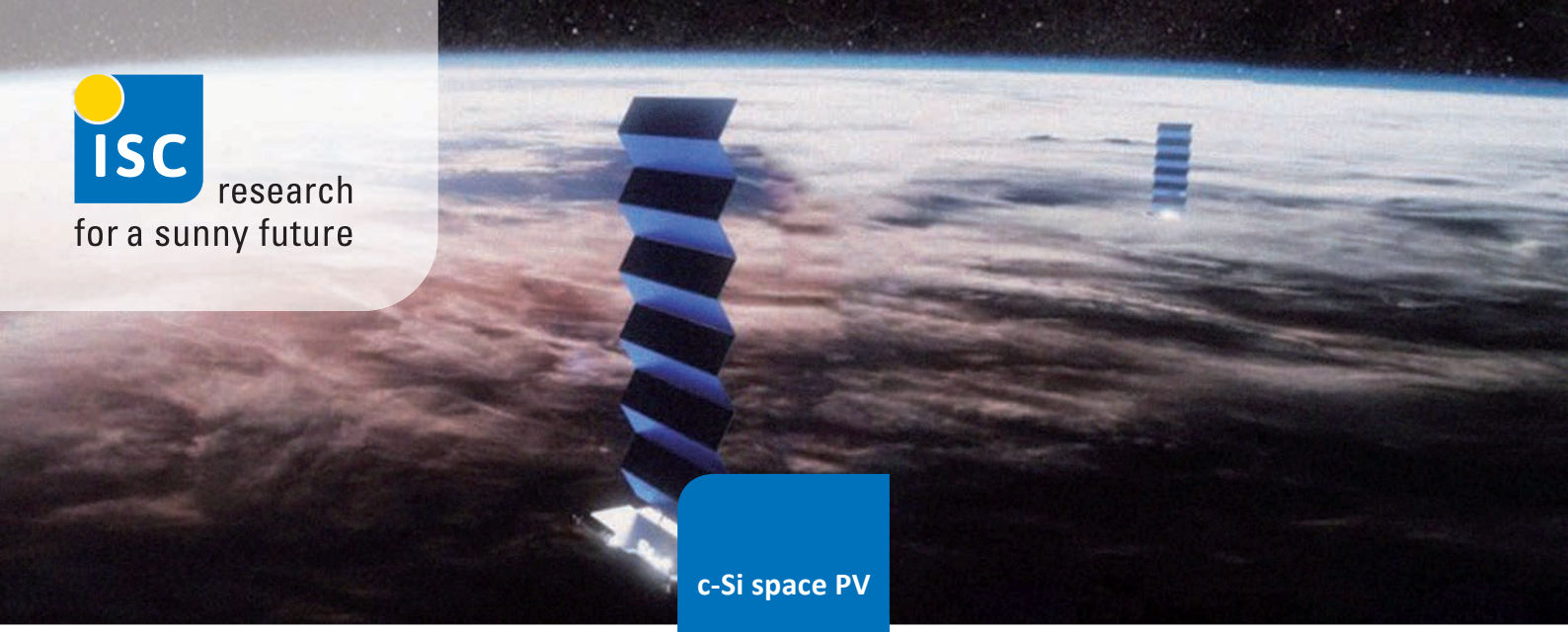
ISC research
for a sunny future



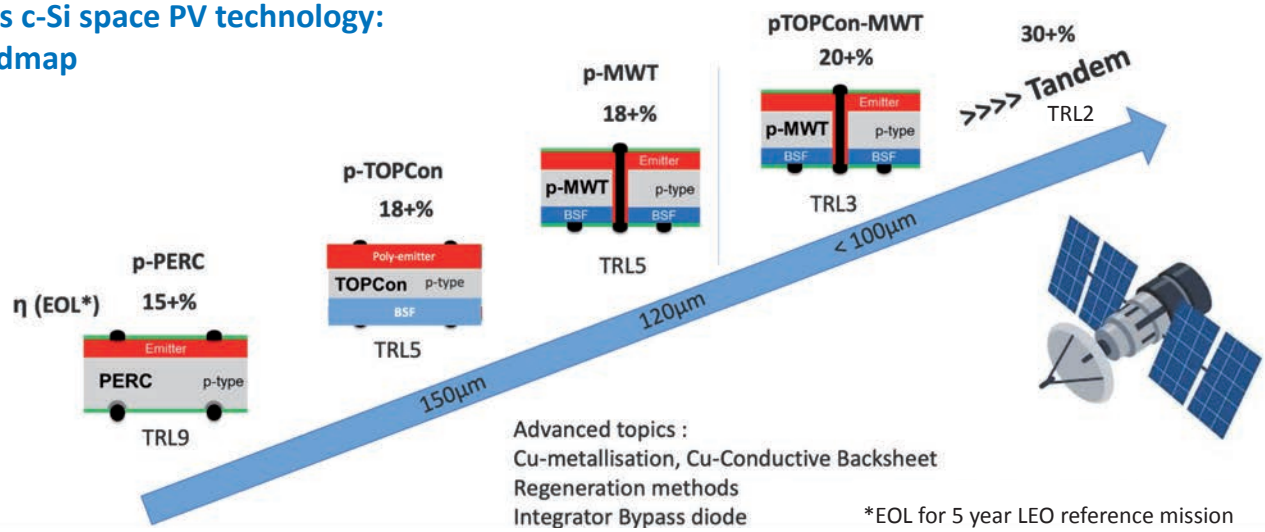
c-Si space PV

We offer

- improved mission prediction forecasts
- fabrication of bifacial p-type technology
- fabrication of rear contact p-type technology
- studies of radiation hardness procedures
- Photovoltaic Assembly (PVA) with several partners

Support of space tech companies with production and training

ISC's c-Si space PV technology: roadmap



*EOL for 5 year LEO reference mission

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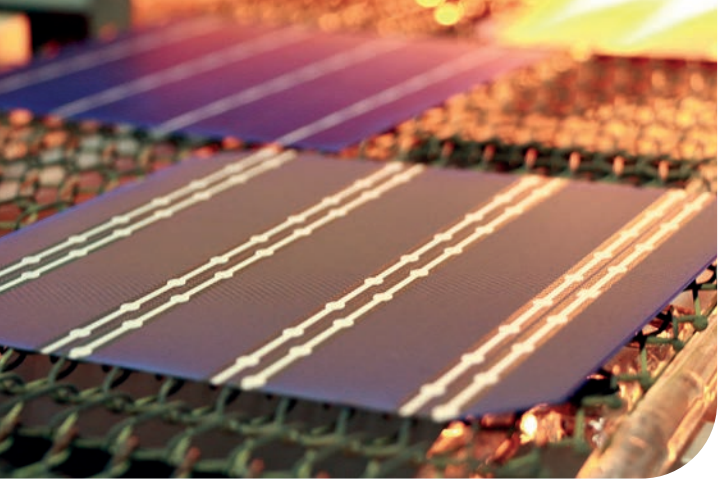
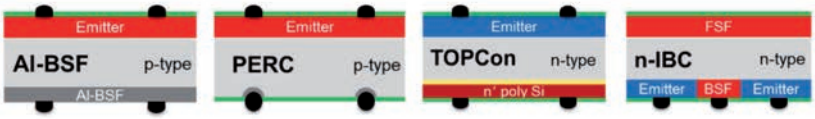
ISC-Track record in c-Si space PV

- Development of **p-type tech since 2005**
- Development of **p-type space PV since 2017**
- Detailed knowledge of solar cell concepts for different space condition
- Optimization of cell process for different space conditions and with detailed testing
- Contacts to cell producers



Space c-Si technology: cell concepts

Cell types currently in mass production for terrestrial PV application[1]



Cell types in pilot lines or in R&D[2]

Key design features:

Front Junction & Front Contact

(Al-BSF, PERC, PERT, TOPCon, *p*-MWT)

Front Junction & Back Contact

(*p*-EWT)

Back Junction & Back Contact

(*n*-IBC, *p*-IBC)

Our goal in this study:
- Device modelling
- Experimental data

Many c-Si technologies: which ones are suited for space applications?

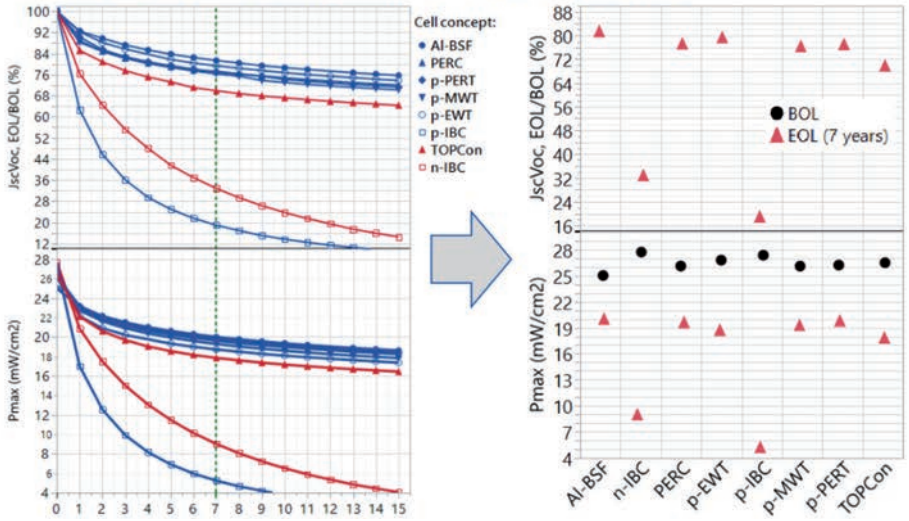
Legend:

n+ diffusion (e.g., $POCl_3$) · n+ poly-Si (e.g., LPCVD) · p+ diffusion (e.g., BBr_3) · Thin SiO_2 · Al-alloy (p++ BSF) · passivation (e.g., SiN_x, SiO_2/SiN_x) · Contacts & BBs (e.g., Ag, Ag/Al)

[1] including silicon heterojunction concept (SHJ)
[2] PERC-MWT concept is in mass production

Space c-Si technology: mission predictions

Example of a LEO mission prediction for various cell concepts



Best cell design features

Front Junction & Front Contact

(Al-BSF, PERC, *p*-PERT, *p*-MWT)

Front Junction & Back Contact

(*p*-EWT)

p-type substrate

Not suitable designs

Back Junction & Back Contact

(*n*-IBC, *p*-IBC)

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