# Outline for the SRF part of the US Pre-Lab program

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# ILC Pre-Lab US SRF Program Draft

- **Note:** The plan presented here is a first draft. More discussion is needed.

- **Constrains / assumptions:**
  - Ship cryomodule(s) to Japan by year 4 as final transportation test
  - Implement realistic timeline
  - Mitigate risks while leaving option for further cavity process R&D
  - Parallel 9-cell cavity testing and module assembly lines at FNAL and JLAB

- **Plan addresses the major pre-lab SRF goals for technical preparation (as defined by IDT)**
  1) **SRF performance R&D**
  2) **Yield testing on a large number of SRF cavities**
  3) **Fabrication, shipping, and testing of SRF cryomodules**

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| Task | Notes | Goal | US Labs | Year 1 | Year 2 | Year 3 | Year 4 |
|---|---|---|---|---|---|---|---|
| Field emission and cavity cleaning R&D, e.g. HPP and plasma processing on cavities, development of robotics during cavity assembly, and LN cleaning | | (1) Perf | Cornell, FNAL, JLAB, others? | | | | |
| Yield study (1) with 30 new 9-cell cavities; cold EP + 2-step bake | use new cavities from established vendor | (2) Yield | FNAL, JLAB | | | | |
| Single cell and 9-cell R&D program to further optimize cavity preparation protocol | | (1) Perf | Cornell, FNAL, JLAB, others? | | | | |
| Yield study (2) with 30 new 9-cell cavities; optimized preparation protocol | | (2) Yield | FNAL, JLAB | | | | |
| | | | | | | | |
| Module transport engineering design and studies, including dummy module transport | | (3) CM | FNAL, JLAB, SLAC | | | | |
| Cryomodule optimization for transport | | (3) CM | FNAL, JLAB, SLAC | | | | |
| Cavity accessory components R&D (e.g., tuner, coupler…), e.g. for higher gradients | | (3) CM | Cornell, FNAL, JLAB, others? | | | | |
| Order/fab components for 4 prototype cryomodules | | (3) CM | FNAL, JLAB | | | | |
| Assembly and testing of two prototype cryomodules, with cavities from yield study (1) | | (3) CM | FNAL, JLAB | | | | |
| Field emission studies, including HPP and plasma processing on cryomodules | | (3) CM | FNAL, JLAB | | | | |
| Cryomodule transportation testing (US roundtrips) | | (3) CM | FNAL, JLAB | | | | |
| Cryomodule transportation testing (ship to Japan) | cavities used from yield study (1) would have to be compliant with Japanese HPG regulation | (3) CM | FNAL, JLAB | | | | |
| Assembly and testing of two prototype cryomodules, with cavities from yield study (2); implement field emission prevention methods during assembly, e.g. robotics in collaboration with CEA | | (3) CM | FNAL, JLAB | | | | |
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| Engineering Design Report (SRF part) | | EDR | All | | | | |
| Preparation for mass production / module assembly | | Planning and preparation | FNAL, JLAB, others? | | | | |
| US supply chain development | | Planning and preparation | FNAL, JLAB, others? | | | | |