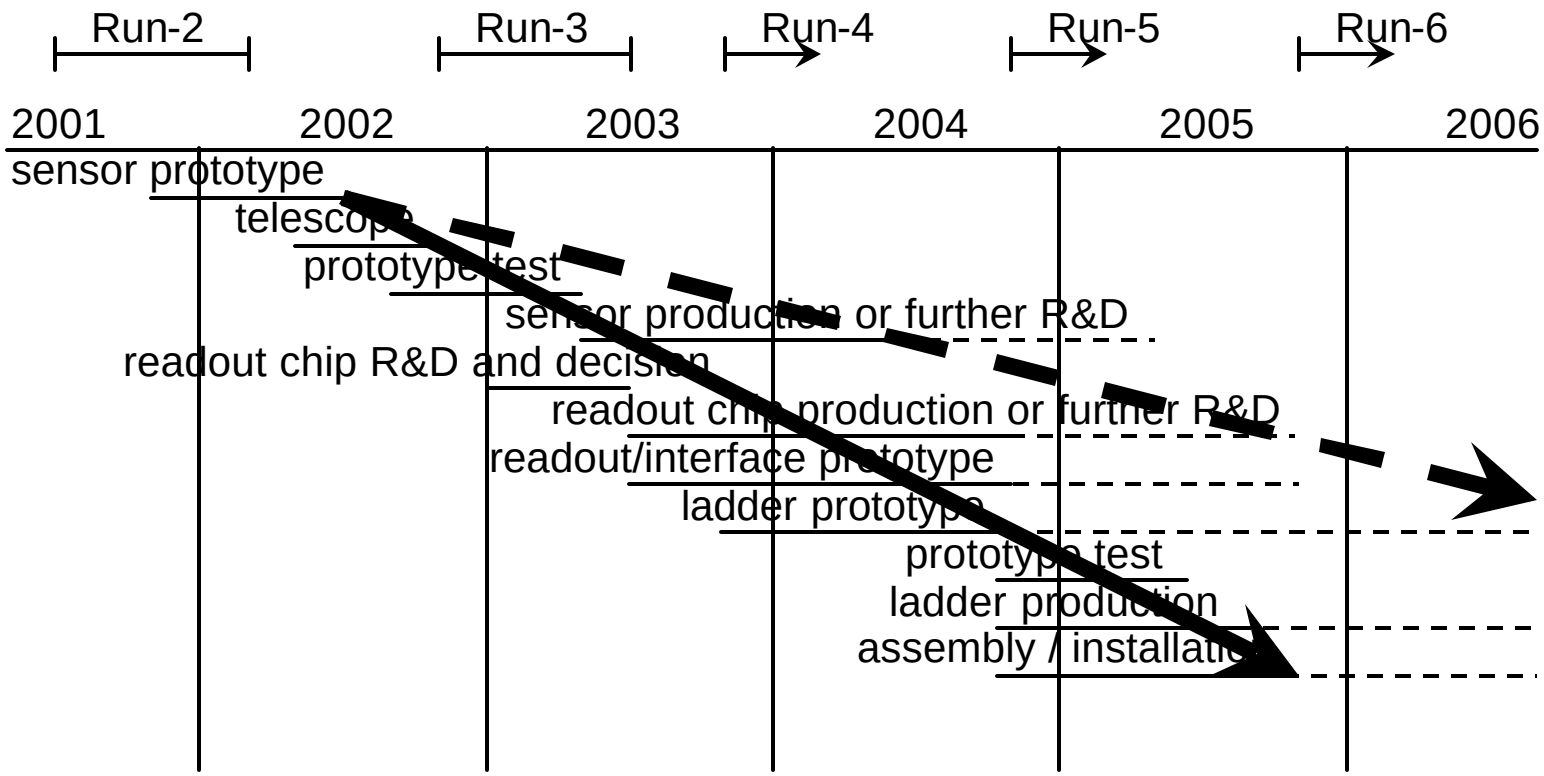
Silicon strip detector



- R&D issues
  - readout chip decision
  - interface with PHENIX
  - ladder
- Technical options
  - SVX4 or MVD-TGV+AMU/ADC recut
  - other sensors

➔ Strip sensor
BNL instrumentation / RIKEN / Kyoto U.
Strip readout / Interface with PHENIX
BNL / ORNL / RIKEN / Kyoto U.

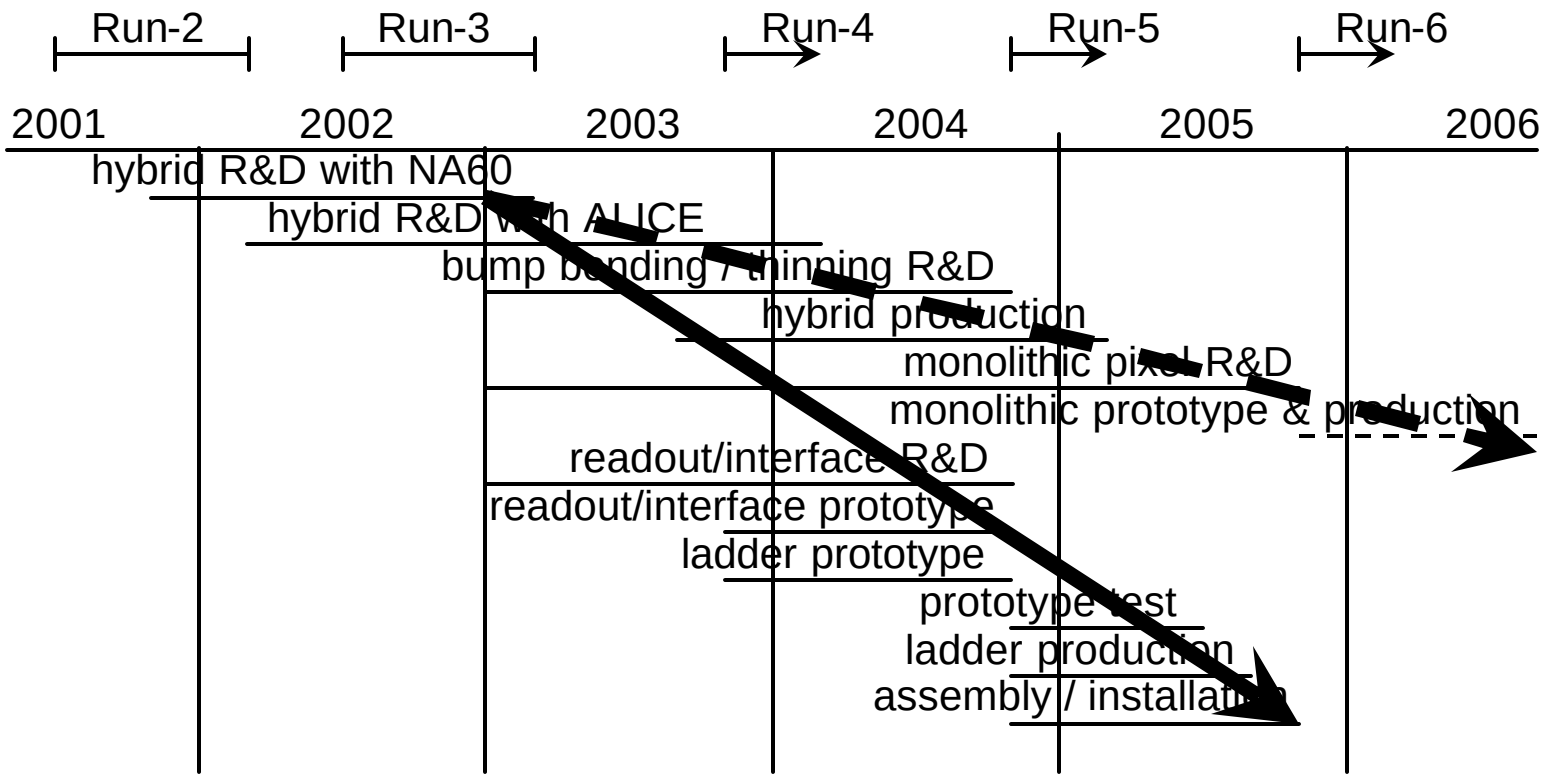
Strip sensor

- Technical options
  - Zheng Li's sensor or other sensors
- R&D
  - telescope with VA2 readout chip and its beam test ongoing
  - cooling
  - readout chip decision …
  - interface with PHENIX …
- Manpower
  - BNL instrumentation / RIKEN / Kyoto U.

Strip sensor readout / Interface with PHENIX

- Technical options
  - SVX4 readout chip or MVD-TGV+AMU/ADC recut
  - data management method – ladder structure
    - local processing or driving signals on kapton cables
    - buffering capability
    - low power data transmission
- R&D
  - mismatch of Zheng Li's sensor (DC coupling) and SVX4 chip (AC coupling)
    - accumulation of leakage current – frequent reset of the SVX4
    - cooling (lower than the room temperature) to decrease leakage current
  - ladder structure
- Manpower

Silicon pixel detector



- R&D issues
  - readout / interface with PHENIX
  - bump bonding / thinning
- Technical options
  - monolithic pixel
  - other hybrids

➔ Hybrid pixel
RIKEN / Stony Brook
Bump bonding / Thinning
ISU / RIKEN
Monolithic pixel
ISU
Hybrid pixel readout / Interface with PHENIX
Stony Brook / RIKEN

Hybrid pixel

- Technical options
  - ALICE1 hybrid or other hybrids
  - BTeV FPIX2 readout chip
  - monolithic pixel …
- R&D
  - readout interface with PHENIX …
  - bump bonding / thinning …
- Manpower
  - RIKEN
    - collaboration with NA60 / ALICE
    - 2 FTE post-docs at CERN (and 1-2 more will be added)

Bump bonding / Thinning

- Technical options
  - Fermilab-led efforts
    - PHENIX involvement by ISU
    - McNC North Carolina/Unitive
    - AIT Hong-Kong
  - CERN-led efforts
    - PHENIX involvement by RIKEN
- R&D
  - alternative options for bump bonding / thining
    - evaluation of bump-bonding samples made by McNC and AIT
- Manpower
  - R&D proposal
    - 0.5 FTE at post-doc level in FY2003 and FY2004
  - RIKEN
    - collaboration with NA60 / ALICE
    - 2 FTE post-docs at CERN (and 1-2 more will be added)

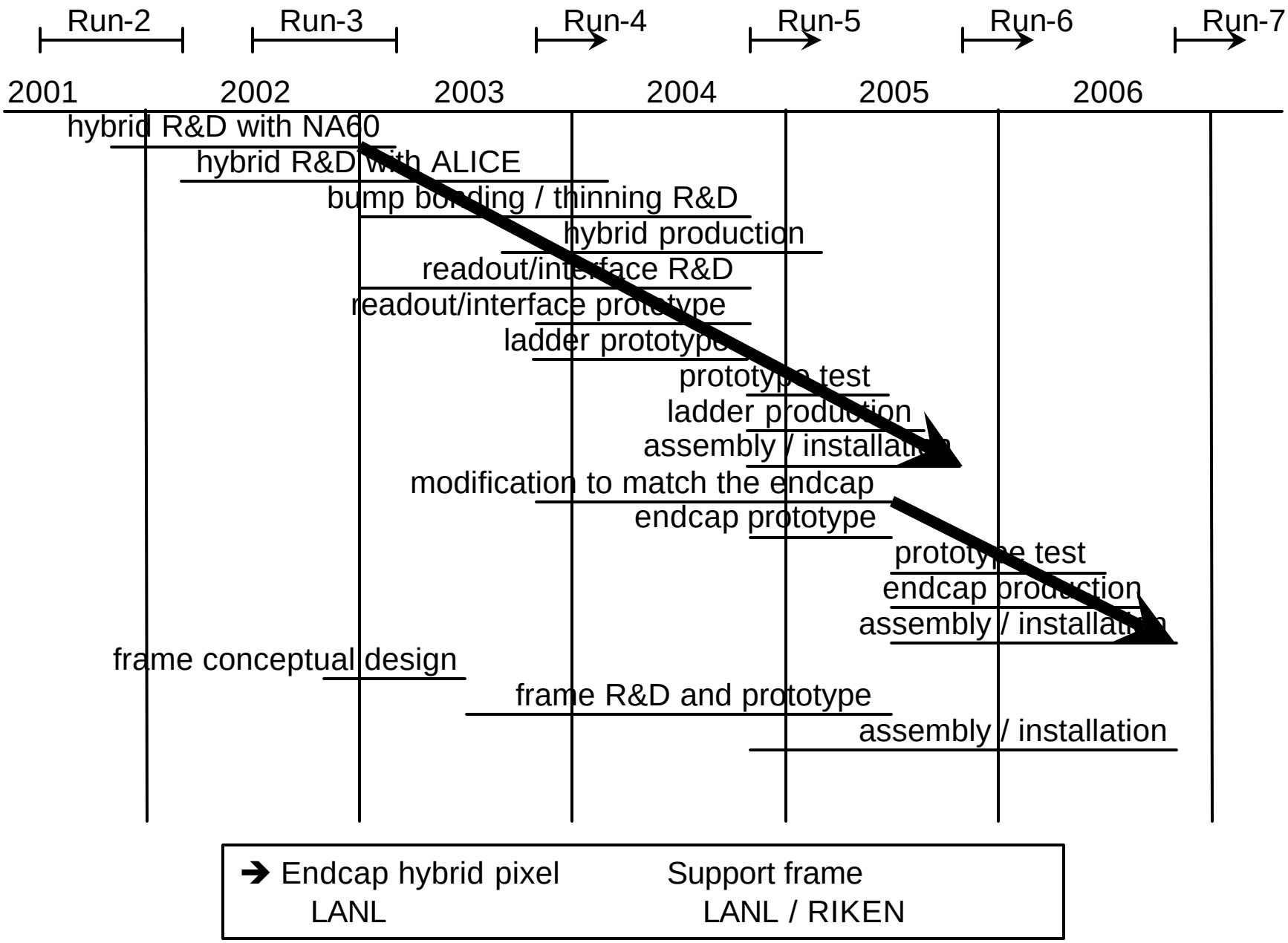
Monolithic pixel

- Technical options
  - epitaxial monolithic detectors by LEPSI
  - float-zone monolithic detectors by Bonn/Munich
- R&D
  - increased speed of readout
    - R&D started
    - readout time halved to 110 nsec/pixel or 5 μsec/chip
    - next steps, event buffering
  - thick, high-quality silicon
    - partner with Munich/Bonn groups to build readout on top of detector-grade silicon
- Manpower
  - R&D proposal
    - 0.5 FTE at post-doc level and 1 FTE master student in FY2003 – FY2005

Hybrid pixel readout / Interface with PHENIX

- Technical options
  - ALICE pilot chip or our own pilot chip
  - FEM or FEM+CCB
- R&D
  - parallelization of readout
  - development of FEM (and CCB)
- Manpower
  - R&D proposal
  - RIKEN
    - collaboration is starting with KEK instrumentation

Silicon endcap pixel and Support frame



Endcap pixel

- Technical options
- R&D
  - increased capacitance load on the readout chip
  - sensor pad topology
  - routing of control lines
  - location of the pilot chip
- Manpower

Support frame

- Technical options
  - conceptual design by the engineering team that designed the ATLAS support frame (HYTEC)
  - recommendation as to the best technical appoach and the areas that need further study and prototype
- R&D
- Manpower

R&D budget request

- PHENIX institutional involvement
  - Silicon strip
    - BNL (physics, instrumentation), RIKEN, Kyoto U., ORNL
  - Silicon pixel
    - RIKEN, Stony Brook, ISU
  - Endcap pixel
    - LANL
  - Support frame
    - LANL, RIKEN
- Related R&D efforts
  - Hybrid pixel
    - NA60, ALICE
  - Monolithic pixel
    - STAR