LINEAR MEDIA HANDLING EXPERTISE

What we are about
Who we are
What we do
What we produce

Focus

- Linear Media Handling Application Experts
- Custom design and product expertise to support all customer needs.
- Ability to perform final coil wind – system of processes used to handle robust to extremely fragile and delicate linear media in a versatile and automated fashion ranging from R&D to manufacturing.
  - Electromagnetic component development - conventional and superconducting (ex: coil)
    - Multiphysics analysis, design, build, & test
    - Operational use of component in final product
  - Apparatus development necessary for producing electromagnetic components (such as SC coils made of reacted MgB_2, YBCO, BSCCO, or Nb_3Sn)

How we produce

Current opportunities
When
Why
What

Market

- Superconductors (SC)
  - Shaped elements of superconducting materials are just now becoming useful for commercial products
    - Cryogenics are only recently developing for manufacturing level application use
    - Low & High Temperature Superconductors (LTS & HTS) finally developing for manufacturing level application use. Previously only MRIs for LTS.
  - Manufacturing: Need to get products out of the lab
    - Field requires very robust coil. Must understand through experience in each stage of development [1 → 2 → 3 → 4]
      1. Individual wire in the lab
      2. Coil in the lab
      3. Single prototype coil
      4. Coil in the field (manufactured entity)
    - Must deliver production efficiency
    - Leaving media handling to the experts allows companies to focus on their particular specialties which increases their overall market share with less risk.
  - Processes must deliver technical performance, reliability, and quality control
    - Need to understand mechanical properties (stress/strain relationships that lead to fatigue)
      - mechanical: from bending, pulling
      - thermal: due to cycles of cooling contraction and warming expansion
      - electromagnetic: forces during operation
    - Need to address shaped material specific requirements
      - Direct linear and non-linear closed loop control with adaptive optimization
      - Axial tension control
      - No reverse bends
      - Bend radius control
      - Lateral position control
      - Dynamic surfaces that minimize friction
      - Lower End: Very small axial length & diameter, down to a few mm
      - Upper End: Very large axial length & diameter, up to many meters

Why InfPhy

Talent

- Capabilities that apply to this Focus -- Many years of experience and successful solutions in:
  - Conventional to superconducting coil analysis, design, build, and test.
  - Typical wire to specialized fragile linear media handling applications.
  - Sensitive closed loop linear and non-linear feedback controls including development of application specific sensors.
  - Small to extremely large mechanical designs.

How
How: Qualitative
How: Quantitative

Solutions

- R&D
  - Optimize linear media handling parameters
  - Adaptability to specific media handling requirements
  - Versatility: System of processes can be tailored to many different applications
- Manufacturing
  - Fully automated production processes
    - Rich collection of measurements are compiled and processed to yield Quality Control & Repeatability
    - Allow user to set operational parameters
    - High media throughput

Developed Processes & Machines

- Unique processes and associated machines developed to solve these new problems.
  - First & only solution on the market.
  - No competition allowed.
    - Machines & processes all patent protection pending.