



U.S. DEPARTMENT OF  
**ENERGY**



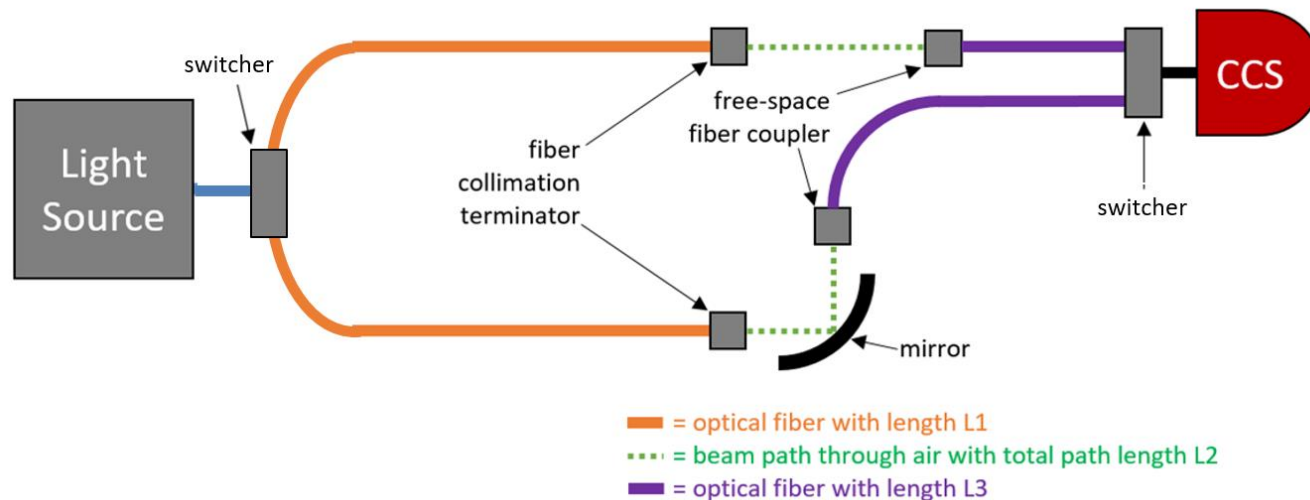
# UV Reflectivity Test Station Proposal

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# Proposal for UV-Spectrum Test Station



System diagram of proposed test station setup for a UV-Spectrum Reflectivity Test Station.

- Replace RP26 probe with stocked components and alter test beam transmission paths
- Benefits
  - Stocked components can typically be ordered and received within two weeks
  - Using one CCS helps reduce measurement errors caused by inconsistencies between CCSs
  - Beam paths for reference and reflectivity measurements are identical
    - All optical fiber segment lengths are equal
    - Both legs have section where test beam is propagated through air
      - Helps account for any losses through fiber-to-air and air-to-fiber connections in measurement leg

# Proposal for UV-Spectrum Test Station – Light Source

- Newport model # 66080-30DU-Q15, 30-W deuterium lamp
  - Rated for output of 160–500 nm wavelength light
- Needs optical fiber coupler to propagate light into fibers
  - Discussions still in progress with Newport on appropriate part



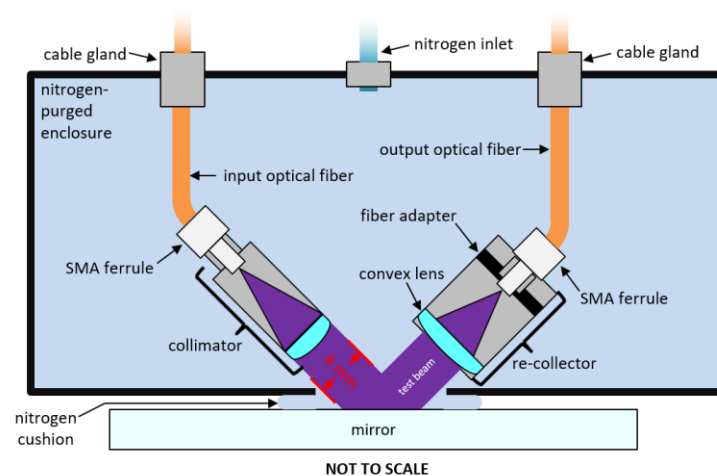
Newport's photo of 66080-30DU-Q15 deuterium lamp .

# Proposal for UV-Spectrum Test Station – Switcher

- Looking for a switching solution that can be used for 50/50 splitting of test beam and routing test beams to CCS
  - Exact part still under investigation
  - Cannot use pre-made fiber-optic switcher from Thorlabs due to UV wavelengths to be used with test station
- Potential options
  - Movable mirror to route test beam to only one leg at a time
  - 50/50 beam-splitter with shutter system to block light from one leg during measurements of the other

# Proposal for UV-Spectrum Test Station – Probe Assembly

- UV-damage-resistant fiber patch cables
  - Thorlabs part # M112L02
- Optical fiber collimation terminator
  - Allows test beam to be collimated before propagating through air
  - Edmunds Optics part # 88-173
- Free-space fiber coupler
  - 20.1-mm focal length convex lens and an SMA fiber adapter to refocus collimated test beam from air back into an optical fiber
  - Thorlabs part #'s LA4647 and SM05SMA
- Nitrogen-purged enclosure
  - Prevents UV light from being absorbed in oxygen
  - Window where test beam exits enclosure is open, allowing nitrogen to create a cushion between enclosure and mirror



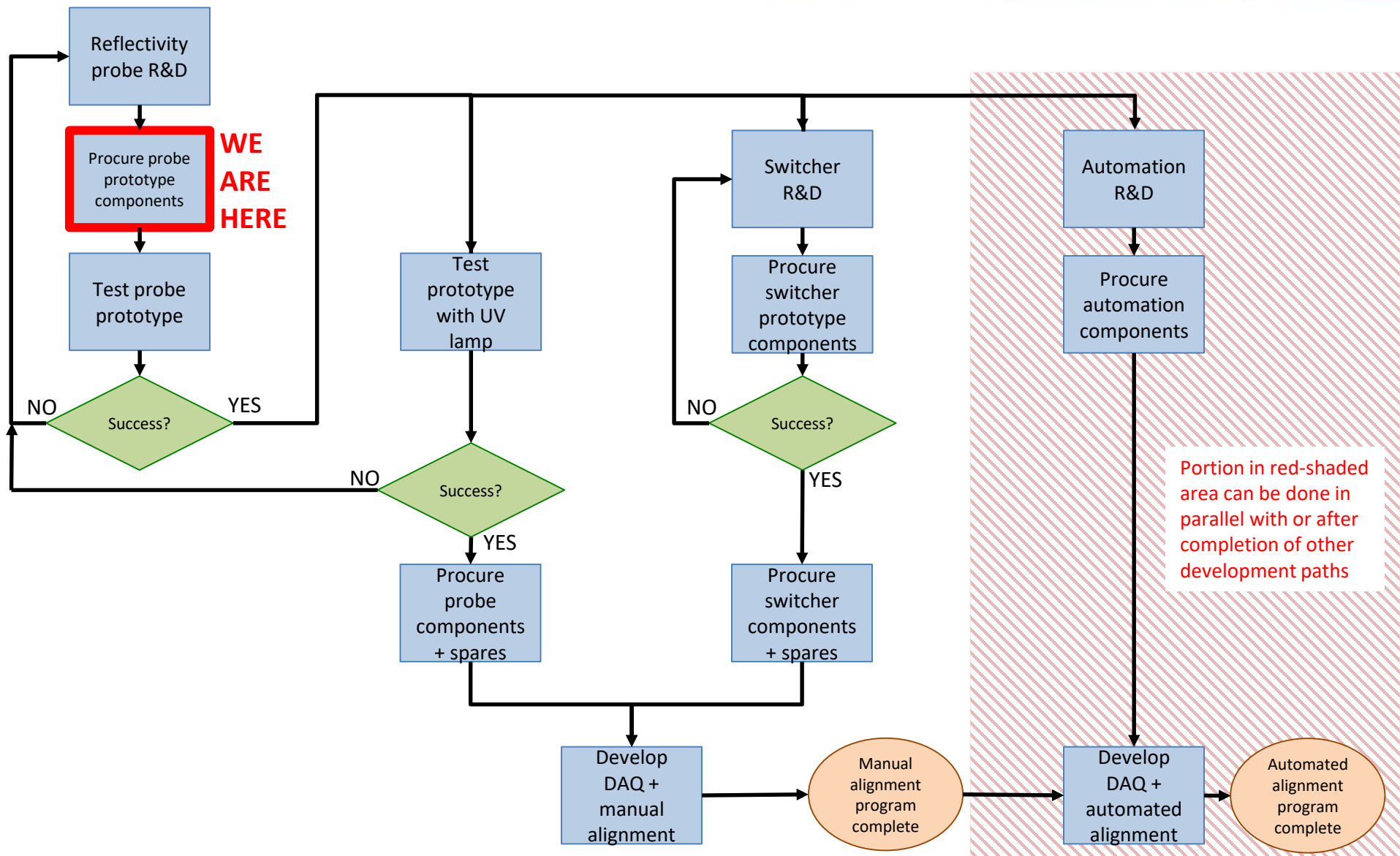
# Proposal for UV-Spectrum Test Station – Measurement Device

- Thorlabs CCS200 compact CCD spectrometer
- Comes shipped with Thorlabs' Optical Software Analysis program for taking data with CCS
  - Can also use LabVIEW to create a custom program
- Two on hand



Thorlabs' photo of CCS200 compact CCD spectrometer.

# Flowchart of System Development





# Prototyping Procurement Request

- Can procurement of prototyping components start?
  - Project charge code?
- Probe prototype components (blue table) are needed
  - UV lamp should be procured at this point, but not mandatory (green table)
- Before any procurement submissions, final item and cost list will be sent to collaborators for approval
  - Still looking for a collimator holder

Item	Quantity
Collimator	1
Lens tube	1
Lens tube retaining ring	1
Plano-convex lens	1
Fiber adapter	1
Optical fibers	2
Spanner wrench for fiber adapter	1
Lens tube spanner	1
45°-base plate	2
Lens tube holder	1
Collimator holder	1

Item	Quantity
UV Lamp	1

# Other Questions

- Timeline?
- Shape of mirrors?
  - Flat or curved?
  - Dimensions of largest to be tested?
- Do we want to start with automation?
  - Benefit: Faster and more repeatable measurements
  - Disadvantage: Longer lead time for development of test station
- Any questions for me?

**Thank You**