Justification of Need –

How to demonstrate your need

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Justification of Need – Be aware

- Reality check: Most proposals fail because the *need* is not convincingly demonstrated
  - It is important to understand the difference between *need* and *want*

- Anchor <u>everything</u> to NIH-funded science
  - Mindset: Without this instrument, this specific part/aim/focus of funded NIH research cannot be completed

- Big thing to demonstrate: A growing imminent need
  - The restriction is coming. This instrument will overcome this challenge.

Justification of Need – General Overview

- Page limit: 6 pages
- Questions to answer in this section
  - Need is clearly and adequately justified
  - Instrument is essential and appropriate
  - Specific features/accessories/software justified and used by many
  - Accessible Usage Time is well explained, defined, and reasonable for the instrument and the environment
  - Will the general User community benefit from the instrument?
  - Is the use of the instrument on a shared basis assured

Is your instrument eligible?

- Make sure the instrument you want to get is eligible
  - An instrument with a base cost of less than $50,000;
  - Multiple instruments bundled together;
  - Purely instructional equipment;
  - Instruments used for clinical (billable) care;
  - Instruments or integrated systems that are not commercially available and do not have a manufacturer warranty;
  - Institutional administrative management systems, clinical management systems;
  - Software, unless it is integrated in the operation of the instrument and/or necessary for generation of high-quality experimental data from the instrument;
  - Multiple stand-alone workstations for data processing, software licenses, and duplicate software items;
  - General purpose equipment (such as standard machine shop equipment), equipment to furnish a research facility (such as autoclaves, hoods, equipment to upgrade animal facilities), equipment for routine sustaining infrastructure (such as standard computer networks or general-purpose data storage systems);
  - Disposable devices, office furniture, and supplies;
  - Alteration or renovation of space to house the instruments.

Common Need Types

- Common classes of need:
  - Replacement of end-of-life instrument
  - Completely new to your institution/region
  - Major instrument upgrade or duplication

These two are easiest for me

Demonstration of capacity, or the lack thereof, is critical

Why this instrument and where?

- Prove no adequate alternative exists
  - Inventory of similar instruments
    - The more “advanced” the larger your search radius
  - Explain why similar instruments cannot meet the imminent need
    - Unavailable, beyond capacity, technically insufficient, transportation of samples
    - Don’t be cute: Your reviewers know the reality…
  - Why does this need to be at your building/institute?

Justify EVERYTHING!

- Justify specific model AND the components
  - Direct comparisons between commercial systems is critical
    - Can't do an on-site demo? Send samples somewhere
    - Leverage your friends, colleagues, and vendors
  - Each feature/component must be essential to the research success
    - Multiple Major Users per feature
    - Preliminary data is impactful and, in most cases, non-negotiable

Example data goes a long way

[redacted]

Table 6. Comparison between the Nikon A1R and AXR

Feature	A1R (current)	AXR (requested)
Max FoV (20x 0.75 NA, diagonal, Resonant)	900.5 µm	1250.0 µm
Max Number of Voxels: Galvonometer/Resonant	4096 x4096 512 x 512	8192 x 8192 2048 x 2048
Galvonometer max fps	30 @ 512 x 512	30 @ 2048 x 512
Resonant max fps	230 @ 512 x 16	720 @ 2048 x 16
Detectors	2x standard, 2x GaAsP	2x multiAlkali, 2x GaAsP
Filters	DAPI, CFP, GFP, YFP, TRITC, Cy5	DAPI, CFP, GFP, YFP/mCherry, TRITC/Cy5
Perfect Focus System	PFS 3	PFS 4
Max Piezo Z	100 µm	600 µm
Lasers	405, 488, 561, 640 nm	405, 488, 561, 640 nm

1.4.1 Demonstration of Need for AXR Components

[redacted] have used the Nikon A1R to its fullest potential, generating data that has resulted in [redacted] and nearly 1400 citations since its acquisition in [redacted]. However, the available capabilities are now hindering scientific production and leading to lost time. These constraints are due to the limited field of view (**Fig. 1**), slow data acquisition speeds, reduced detection capabilities, and the inability to use high-NA water immersion objectives for long-term live cell imaging and scanning of multiwell plates and slides with appropriate refractive index matching (**Fig. 2**). The requested Nikon AXR includes multiple features that can also be found on our current A1R, but with improved capabilities to offset these restrictions. [redacted] need access to these new components to advance their investigations beyond what is currently possible. The relevant components of the Nikon AXR, a summary of the improved capability, their applications, the Major and Minor Users that will benefit from the component, and the pinch points that are hindering their research is detailed below (**Table 7**).

[redacted]

Demonstrate Impact and Access

- User Community
  - The instrument needs to support NIH-funded researchers
    - ≥3 Major Users who must account for ≥Accessible Use Time
  - While being in an established Core is useful, it is not an absolute requirement

General Tips and Tricks

- Be clear, explicit, and concise
- Tables!
- Refer to other sections in a consistent manner
  - Include an executive summary for each section with all the essential information
- Support letters to back up your claims
  - End of life = letter
  - Samples can't be transported due to biological constraints = letter
- The Reviewers are looking at multiple submissions, with each being 50-60 pages long
  - If they get lost or can't quickly find what they are looking for, then you'll have problems…