

NOIRLab Data Management and Software Division

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Modernizing Astronomy Software



Recommendations from Astro2020, Petabyte to Science and Future of Astronomical Software Infrastructure reports:

- **Treat Software as Critical Infrastructure**
 - Invest in sustainable, open-source development; recognize software as a first-class scientific output
- **Build Scalable, Interoperable Systems**
 - Coordinate national efforts to standardize, integrate and future-proof astronomical data systems
- **Empower Cross-Disciplinary Expertise**
 - Fund astroinformatics and statistics to bridge gaps between astronomy, data science and computing



Modernizing Astronomy Software



- Coordinate Through a Central Body
 - Establish a dedicated organization to manage software and data standards, tools and community engagement
- Enable Petabyte-Scale Science
 - Align infrastructure to support next-gen data volumes—streamlined pipelines, smart storage and fast access.

A modern data and software backbone is essential to unlock the next decade of astrophysical breakthroughs.



DMS at NOIRLab



- The Data Management and Software Division (DMS) is fundamental to NOIRLab's mission
- This new division will manage all Software, Data and IT programs and operations
- Responsible for the entire lifecycle of these initiatives



Building the DMS Division



- Build a high-performance software, data and IT division
- Leverage industry standards and best practices
- Standardize processes and implement agile methodologies
- Strengthen collaboration with science stakeholders and the technical community
- Leverage data to drive informed decisions and enhance performance
- Focus on rapid and continuous high-quality delivery



Scalable Platform and Infrastructure



- API-driven architecture and microservices
 - Enable seamless integration through modular and scalable services
- Cloud-based architecture
 - Unified cloud strategy to streamline operations and drive scalable innovation
- Unified data management and science platform
 - Collect, prepare, process and analyze data to promote scientific productivity
 - Standardize protocols and interfaces (e.g. IVOA)



Software Reusability



- Leverage existing software and tools
 - Identify reusable software components
 - Leverage existing software to accelerate development and reduce duplication of effort
 - Prioritize shared software and promote modularity
 - Standardize coding practices, software, tools, libraries and frameworks
- Develop new software and tools
 - Develop scalable, high-quality solutions aligned with the DMS philosophy and methodology of software development



Delivering Incremental Value



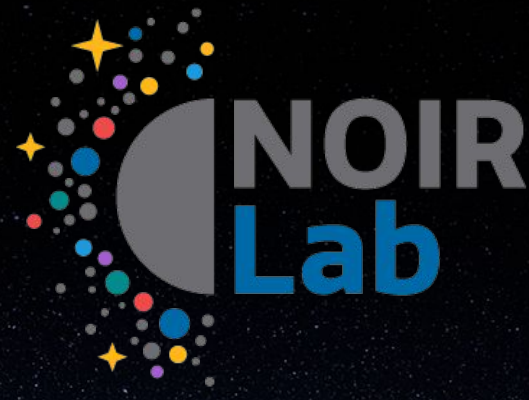
- Adopt modern software culture supported by agile methodologies
- Leverage automation to accelerate development cycles
- Ensure continuous feedback for rapid iteration
- Prioritize customer-centric outcomes
- Track and measure performance using Key Performance Indicators (KPIs)



Summary



- Build a NOIRLab culture for software and data
 - Adopt best practices from industry
 - Prioritize shared software and promote modularity
- Modernize astronomy software and data infrastructure
 - Implement scalable, cloud-based solutions for greater flexibility and collaboration
 - Provide leadership from the Tech world
- Build a foundation for the future
 - Position NOIRLab as a national resource for astronomy software, not just now but in the 2030s
 - Build on the legacy of NOIRLab's programs and community needs



Thank you,
Sap'e, Mahalo,
Muchas Gracias!