



Title: SRDP Project Scope Statement	Author: Treacy, Kern	Date: 5/31/2018
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Science Ready Data Products

Project Scope Statement **Project 530** **Released**

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Change Record

VERSION	DATE	REASON
1.0	4/15/2018	Released on content in draft Ver .01, 3/19/2018 Approved as part of document set defined in 530-SRDP-033-MGMT SRDP CoDR Package Approval by SharePoint workflow
1.01	5/4/2018	Add edits from CoDR
1.09	5/31/2018	Refocused document based on feedback from CoDR



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Introduction

Radio interferometry in general requires significant data processing be completed before the products are appropriate for astronomical analysis. The balance between the data rates produced by interferometers, and the processing capability easily available to the community has fluctuated over the past decades. In the early 2000's data from the VLA could be stored and processed on most laptop systems. For current generation of interferometers like the Jansky VLA and ALMA, the data rates push the processing and storage capabilities of most researchers. The challenges of data management are exacerbated for the next generation of interferometers (ngVLA, SKA-I, ASKAP) as the data volumes continue to outpace the growth of computing capabilities.

The Science Ready Data Products (SRDP) project will address the increasing mismatch between the capabilities of Radio interferometers and the processing capacity of the astronomy community. Defined as part of cooperative agreement between Associated Universities Incorporated (AUI) and the National Science Foundation, the Science Ready Data Products project is the NRAO's highest development priority and a key enabling technology for future interferometers, such as the ngVLA.

The SRDP project will change the way that radio astronomy is conducted. The primary objective is to maximize the scientific impact of the NRAO interferometers by:

- Providing the expertise required to perform data processing so users may focus more on their science and less on data reduction
- Broaden the radio astronomy user community by decreasing the barriers to using NRAO's interferometers
- Curating a rich archive of images for archival study

NRAO has developed significant experience in the development and delivery of SRDP data products. The ALMA calibration and imaging pipelines are in routine use on a daily basis. Developed using the same infrastructure, the VLA calibration pipeline and VLA Sky Survey (VLASS) pipelines have demonstrated many of the heuristics required to produce science ready products at centimeter wavelengths. Infrastructure and archive access tools developed in support of the sky survey are functioning prototypes for SRDP tools. The SRDP project leverages these existing tools and extends their use.

The ALMA telescope has pioneered the delivery of science ready products to PIs. Although improvements remain to achieve true science ready products for most projects from ALMA, community consensus has evolved that SRDPs are both possible and useful. The SRDP project will improve the quality and availability of ALMA products and bring the same capabilities to the VLA and VLBA telescopes.

Project Structure

At the National Radio Astronomy Observatory, the top level organizational structures are referred to as departments. For the SRDP project four departments are involved:

- Data Management and Software (DMS), is a cross observatory department, providing software and data management capabilities for all of the NRAO telescopes.
- New Mexico Operations (NMOps) is responsible for the operations of the VLA and VLBA telescopes. This includes both telescope facing responsibilities (e.g. observation execution, telescope maintenance, and capability enhancement) and user facing (e.g. community days, user documentation, data reduction workshops).
- North American ALMA Operations is parallel to the NMOps department, however is focused on the ALMA telescope. One important distinction is that while NMOps is fully responsible for the operation of the VLA and VLBA, ALMA operations is a tri-lateral partnership.
- Science Support and Research (SSR), like DMS, is a cross observatory department. It is the parent department for the SRDP project.



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The SRDP project will change the way in which radio astronomy is conducted, and thus is changing the operational model of the observatory. Although we choose to treat SRDP as a project in order to benefit from the disciplines of project management and system engineering, SRDP does not have a separate budget. SRDP is managed through the reprioritization of Observatory resources and is fundamentally spend rate limited. As a high priority initiative for the Observatory as a whole, the SRDP project benefits from support throughout the senior management. Matrix organization of most staff in the project allows variances in required effort to be accommodated and leverages existing group structures. One effect of this organization though is that contingency is carried in the departments rather than at the project level.

The SRDP project is unusual in that it will produce both the tools required for production of the science ready products and use those tools in an operational environment to produce the products. This structure of combining construction and operations allows early deployment of capabilities, feedback from operations into the construction phase and encourages communication between the construction and operations teams.

Rather than develop new processes for all of the functions normally associated with a project, we are able to adopt standard processes from the observatory and departments. This simplifies both the project initiation (not requiring the socialization of new processes) and the transition to operations (as the policies are already Observatory norms).

Explicitly the SRDP project will reuse the following Observatory processes:

- Risk Identification and Management is conducted in accordance with the Observatory Standard Operating Procedure. Identification of risk within the project and escalation paths are described in the Project Management Plan.
- Configuration Management of the SRDP deployment is performed by the Software Information Services group (within DMS) in conjunction with other observatory software tools.
- Algorithm Research at NRAO is the responsibility of the Algorithm Research and Development Group (ARDG). Housed within Data Management and Software, the ARDG executes a focused program research into algorithms that the Observatory requires. Algorithmic developments required by SRDP, such as RFI mitigation or robust imaging algorithms are prioritized within the Observatory and delivered by the ARDG.
- Hardware Infrastructure and Capabilities of the Observatory are managed by the DMS department. The SRDP project will slowly increase utilization of these common resources to prevent sudden introduction of resource competition. The overall capability profile will be managed by DMS.
- User Support is affected by dedicated User Support teams within both the ALMA and New Mexico Operations Departments. The SRDP project will support these groups in developing user documentation and education programs.
- The NRAO Helpdesk is existing infrastructure that the SRDP project will utilize to communicate with the user community.

Project Documentation

The current document is intended to provide the overall context of the project and the relationship between the project and other management structures at the Observatory. The next recommended document is the SRDP System Concept (530-SRDP-014-MGMT) which provides the stakeholder view of the system and provides a description of the project deliverables. These are transcribed, without further decomposition, into the Stakeholder Requirements (530-SRDP-014-MGMT).

The Project Charter (530-SRDP-001-MGMT) and Lifecycle Phases and Concepts (530-SRDP-014-MGMT) provide the business case for the project and the project lifecycle respectively.



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The Project Management Plan (530-SRDP-003-MGMT) describes how the SRDP project will be managed. For convenience some sections of the Management Plan have been broken out into separate documents. Requirement management and traceability is described in the System Engineering Management Plan (530-SRDP-010-MGMT).