ARM's First Value-Added Product Code Sprint: a successful development acceleration paradigm

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What is a code sprint? ...and why did we have one?

"A **sprint** is a get-together of people involved in a project to further a focused development of the project. Sprints typically last from one week up to three weeks."
Wikipedia

ARM Value-Added Product (VAP) development has historically taken more time than we'd like and resources are limited.

Could intensive in-person collaboration between ARM developers and science leads accelerate VAP development?

VAP Code Sprint Synopsis

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When	June 23 – 30, 2016
Where	Stony Brook University, NY
What	Goal was to convert 4 Scanning ARM Cloud Radar (SACR) science codes into ARM VAPs
Who	Science Leads: Pavlos, Eugene, Katia, Mariko Developers: Tami, Meng, Karen
Result	All codes were converted into 3 ARM VAPs Data available in Evaluation Area

'SACR-ADVanced' Sprint VAPs

1. SACRADV-VAD
(see adjacent poster by T. Toto)

PVC 20120918 Wind Direction
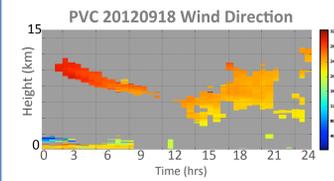
The SACRADV-VAD VAP applies the velocity-azimuth display method to SACR HSRHI scans to provide in-cloud profiles of wind speed and direction.
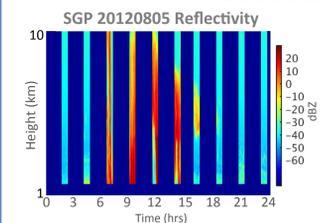
SACRADV-VAD Evaluation data available for 5 sites

2. SACRADV-QVP

OLI 20160522 Reflectivity
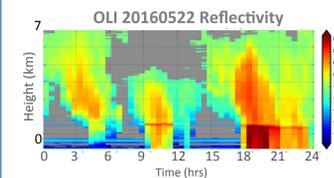
The SACRADV-QVP VAP creates quasi-vertical profiles of reflectivity and polarization fields, based on SACR PPI scans.

SACRADV-QVP Evaluation data for OLI 20160328 - 20160910

3. SACRADV-3D3C

SGP 20120805 Reflectivity

The SACRADV-3D3C VAP converts SACR CWRHI data from radar coordinates to a Cartesian grid, including 3-dimensional Cloud Cover and CFADs.

SACRADV-3D3C Evaluation data soon for SGP 201208

VAP Sprint Diary → POST-Sprint Work...

7 days in June

Day 1
- Presentation on VAP development process
- Assign science lead and developer to each VAP
- Split up into VAP groups to develop a formal VAP Implementation Plan for each algorithm

Days 2-7
- Work in common room
- Set plan and goals for the day
- Code, ask questions, share solutions, consult DMF ADI experts as needed
- Update VAP implementation plans as needed
- Bring in lunch (yes, pizza :) or take a break
- More coding, problem solving
- Discuss day's progress, plan next day
- Document each VAP's status, issues, next day's goals in code sprint 'diary'

POST-Sprint Work...
by developers and translator
July 2016 - March 2017

- Continue language conversion (Fortran -> Python) for complex 3D3C VAP
- Process longer data sets for Evaluation
- Examine output for validity
- Discover various data oddities and issues requiring analysis, additional coding, and reprocessing for each
- Code runs too slowly; analysis and recoding needed
- Add quality assessment code and output fields
- Modify output to meet ARM standards
- Discover existing Data Quality Reports (DQRs) so recode, reprocess as needed
- Competing work priorities lead to 'context-switching' time loss

Benefits of Sprint Paradigm and Future Suggestions

Benefits of our 1st VAP Sprint
- Focused time for science sponsor – developer interactions--very helpful!
- Multiple developers speeds problem solving
- Learning opportunities for all
- Strengthened relationships within ARM
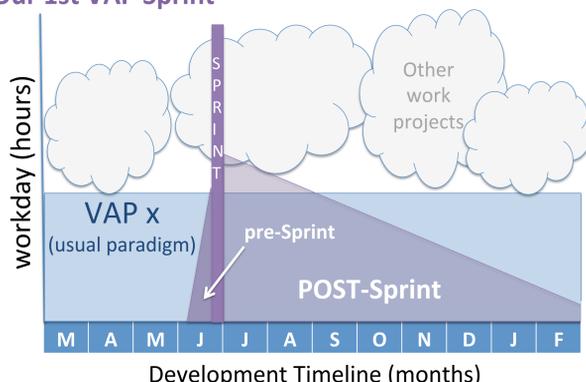- Three SACR VAPs available for evaluation!

Recommendations for Future Sprints
- Careful selection of sprint target products
  - Look for high impact potential
  - Consider overall ARM VAP Priorities
  - Mature codes, tested on **diverse** data sets
  - Assess target products for 'VAP-ification' ease

- More **PRE-sprint** work
  - Literature reviewed by developer
  - Implementation Plan done
  - Consider input data quality
  - Code previewed by developer

- Post-sprint science-lead commitment
  - Consult on data issues if needed
  - Review results prior to release

VAP Development Paradigms

Below are **highly-idealized** models of VAP development. Notice that the blue 'usual paradigm' of VAP development takes more hours than **either** sprint-based paradigm.

Paradigm KEY

	Development as usual		All other work
	1st VAP sprint		Suggested VAP sprint
	Pre-, Post-1st-sprint		Suggested pre-, post-sprint

Our 1st VAP Sprint

workday (hours)

Other work projects

SPRINT

VAP x (usual paradigm)

pre-Sprint

POST-Sprint

M A M J J A S O N D J F
Development Timeline (months)

Suggestion for Future Sprint

workday (hours)

Other work projects

SPRINT

VAP x (usual paradigm)

longer pre-sprint   shorter post-sprint

M A M J J A S O N D J F
Development Timeline (months)