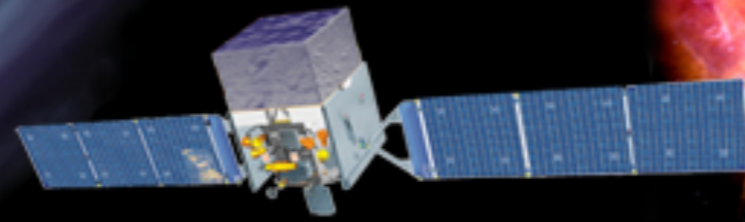


Fermi

Science Support Center



OPERATIONS, DATA SERVERS & SOFTWARE DEVELOPMENT

Elizabeth C. Ferrara
Deputy Lead Scientist, FSSC





MISSION OPERATIONS

- 3 operations support personnel (+1 in training)
- 11 TOO's implemented since last meeting (13 months)
 - 4 for Novae
 - 3 for Crab
 - 3 for flaring AGN
 - 1 other transient event
- Transition to AO-10 effective August 17, 2017
- Positive interactions with new FOT personnel
 - FOT responsiveness to TOO requests has been proactive

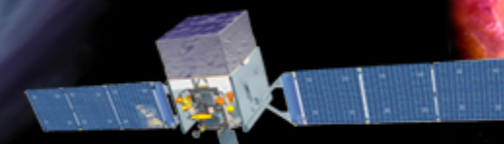
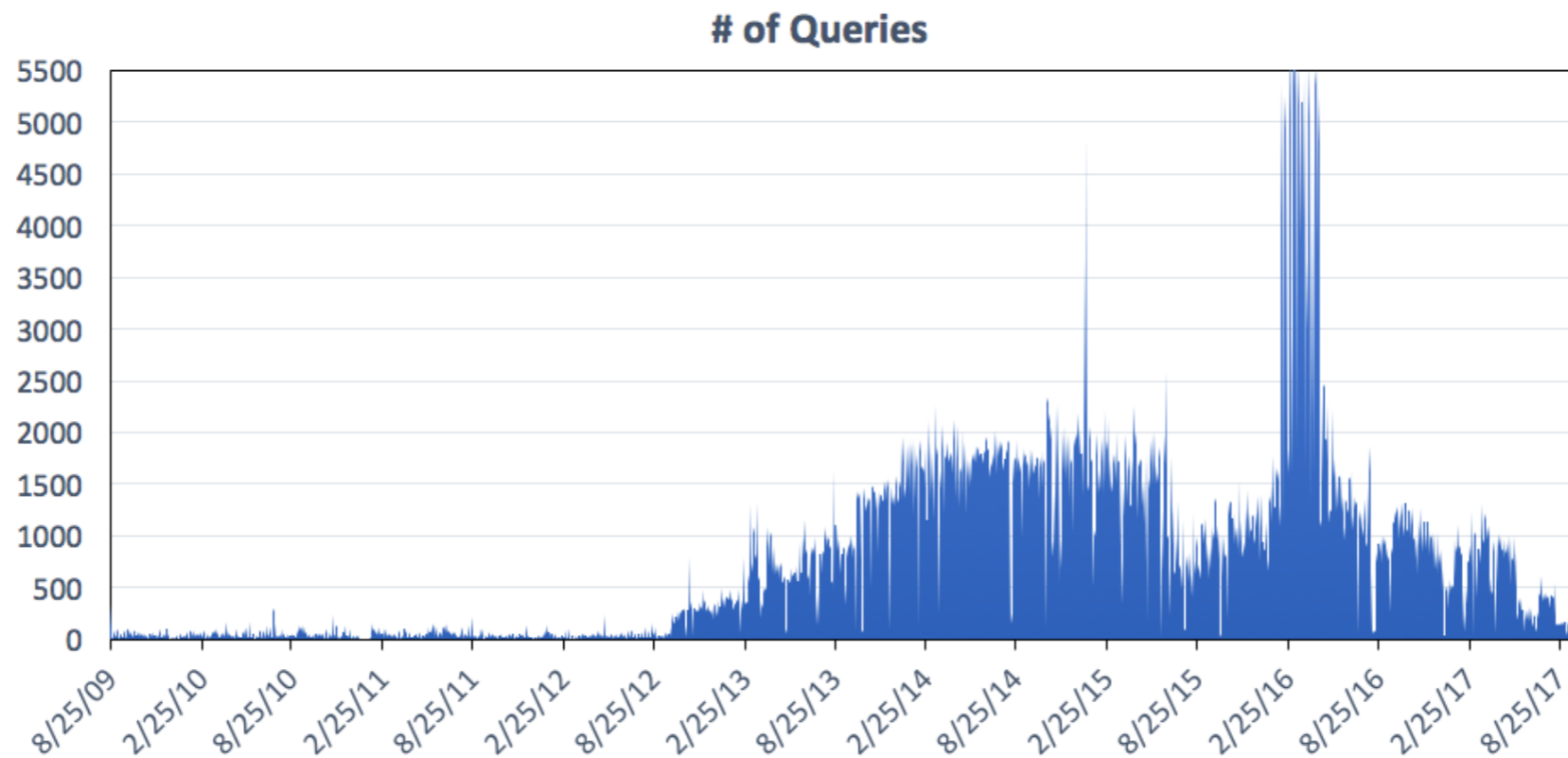




FSSC DATA STATUS

➤ LAT Data Server

- Currently serving: Pass 8 data (since 24 July 2015)
- Data downloaded: 42.06 TB (as of 8 Oct. 2017)
- Mission average queries/day: ~750 (photon database)
- Queries/day (last 30 days): ~130





FSSC DATA STATUS

- LAT Data Server
 - Currently serving: Pass 8 data (since 24 July 2015)
 - Data downloaded: 42.06 TB (as of 8 Oct. 2017)
 - Mission average queries/day: ~750 (photon database)
 - Queries/day (last 30 days): ~130
- Data ingest for both LAT and GBM is proceeding smoothly
 - Added Continuous TTE files for GBM
- Ready for update to GBM data files:
 - Converting continuous TTE files to more convenient hourly format
 - Correcting “timing glitches” present prior to summer 2015





SCIENCE TOOLS CURRENT STATUS

- Current science tools (v10r0p5) release date: 20 Sept 2016
 - Supports:
 - Scientific Linux 5, 6, & 7
 - Mac OS X 10.9, 10.10, & 10.11
 - Fedora 20 & 21
 - Ubuntu 14.04, 14.10
- New version (v11r5p3) in development - currently in testing/bug fixes
 - Will support additional OSs (lots of infrastructure changes):
 - Mac OS X 10.12, Ubuntu 16.04 & 16.10
 - Dropping support for:
 - SL 5, Mac OS X 10.9 & 10.10, Ubuntu 14.04 & 14.10
 - Supports significant improvements to fermipy functionality
- GBM analysis tools:
 - rmfit: v4.3.2 is still current
 - gtburst - update in new release: v01-00-00 ⇒ v02-02-00



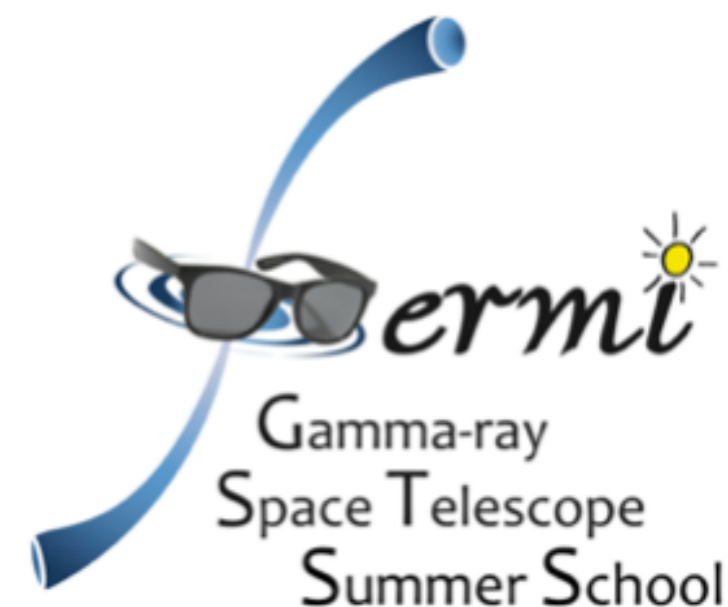
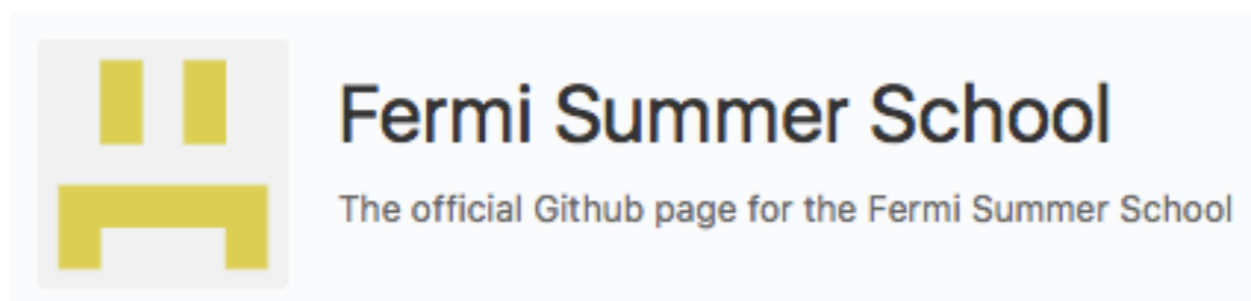
SCIENCE TOOLS PLATFORM USAGE

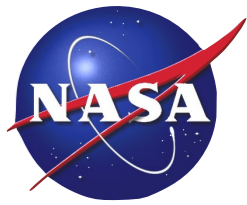
Mac OS X	10.9			10.10			10.11			<i>Total downloads of v10r0p5 =19383</i>	
	930			1765			704				
	4.8%			9.1%			3.6%				
Scientific Linux	SL5			SL6			SL7			Source	
	1891			1562			2074				2606
	9.8%			8.1%			10.7%				13.4%
Other Linux	Ubuntu 14.04		Ubuntu 14.10		Fedora 20		Fedora 21				
	4418		1867		596		970				
	22.8%		9.6%		3.1%		5.0%				



SCIENCE TOOLS CONTAINERIZATION

- Developed annually for Fermi Summer School
- Available on github for general community ([Link](#))
- Intended for cross-platform installation
 - Still issues with some host OSs (mostly Windows)
 - Working to resolve these for next year's version



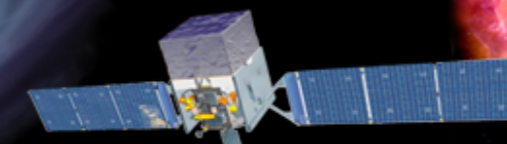
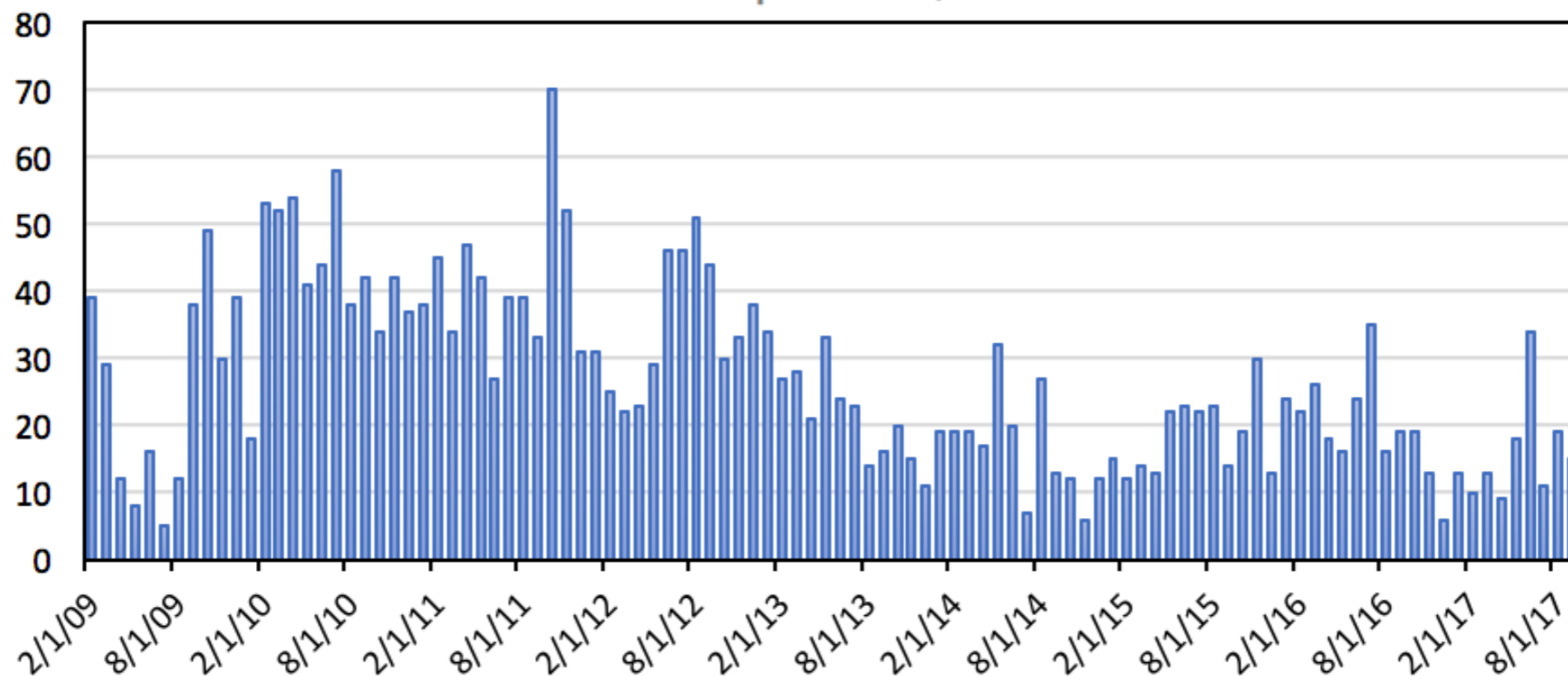


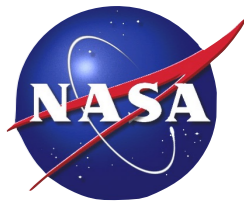
FERMI HELP DESK

► Help Desk

- >3500 requests over the lifetime of the mission
- 0.5 queries/day running average over the last year
- ~80% asking for information, 15% reporting issues, 5% spam

Helpdesk Queries

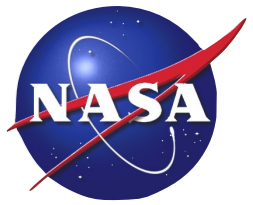




NEW DATA CATALOGS

- Added two new high-level data products
 - 2FAV catalog - 2nd LAT All-sky Variability Catalog
 - 3FHL catalog - 3rd LAT High-Energy Source Catalog (> 10 GeV)
- Coming soon: GBM Earth Occultation Catalog (249 sources)
- New catalogs include significant ancillary information:
 - XML models with final fitted parameters for each source
 - DS9 region files
 - Archive of spatial templates and spectral models for all extended sources included in the catalog analysis.
- Once final, catalogs are imported into BROWSE format to allow for easy searching





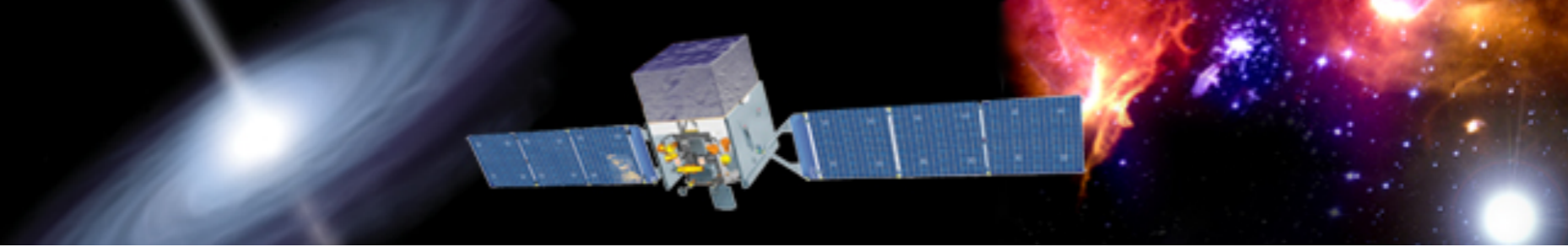
CONTRACT CHANGES

- SESDA3 contract recompeted - Now SESDA4
 - All but 1 software developers changing employers
 - Working to ensure continuity of personnel
 - Critical to DOE transition



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SLAC \Rightarrow FSSC

TRANSITION STATUS





LAT OPERATIONS TRANSITIONING AWAY FROM SLAC

- DOE has planned reductions / workforce transfer to new programs at Launch+10 years
 - After Oct 1, 2018, DOE staff available on “as-needed” basis
 - Current “knowledge transfer” period began in Feb 2017
- Tasks prioritized by mission criticality
 - Mission Operations
 - Data Processing & Archiving
 - Software development & maintenance





PLANNED APPROACH

- Knowledge transfer \Rightarrow Shadow operations \Rightarrow Full transition
- “Divide & Conquer” approach
 - 2-3 FSSC members training for each task, with 1 lead
 - Incorporating expertise from LAT instrument team, when available
- FSSC personnel reoriented to cover additional workload
 - Reduced one management FTE, added two developer FTEs
 - Refocused available skill sets
 - Recovered legacy knowledge





“SOFTWARE WEEKS” FOR INTENSIVE TRAINING

- Two software weeks complete (Feb. & Sept. 2017)
 - FSSC/LAT/SLAC personnel face-to-face training
 - Focused breakout sessions ⇒ High level of knowledge transfer
- Two more software weeks planned
 - Jan. 29 - Feb. 2, 2018: Finalize training and initiate full shadow operations
 - Late Aug./Early Sept. 2018: Review results of shadow ops and complete any necessary training





MISSION OPERATIONS TRANSITION

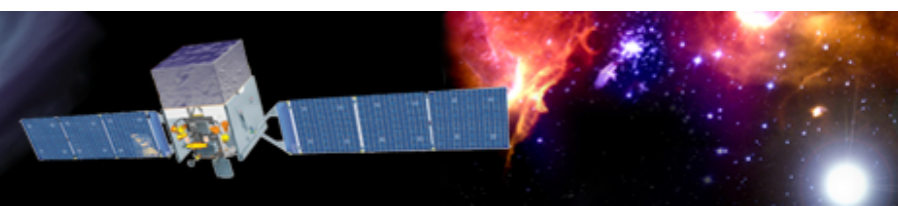
- Currently performing partial Shadow Operations
- Training for nominal timeline planning complete
 - FSSC personnel now performing planning/review once per month
- Training in progress for providing regular status reporting
- Ongoing training for less-frequent nominal activities
 - LAT calibration requests, Tracker hot strip masks, etc.
- Non-nominal tasks (flight software updates, etc.) will continue to be supported by DOE personnel as needed

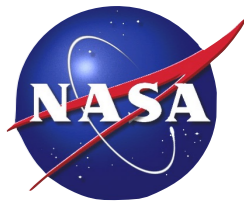




DATA PROCESSING & ARCHIVING

- Currently in Knowledge Transfer
- Initial training at September 2017 software week
 - FSSC personnel now asking questions, reviewing documentation, and writing procedures
 - Shadow operations expected to begin Feb. 2018
- New team will result in a significant increase in trained personnel ⇒ Needed for mission critical task

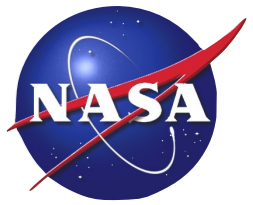




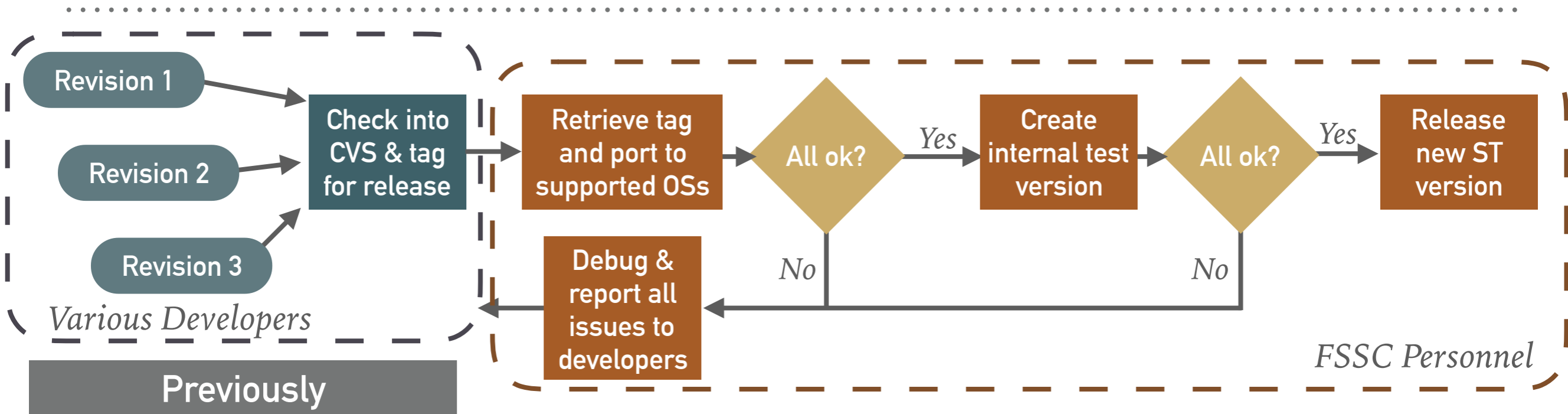
SOFTWARE DEVELOPMENT & MAINTENANCE

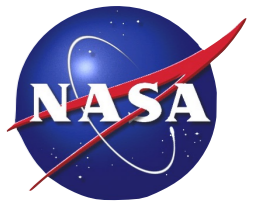
- Transition from current CVS-based repository to github
 - Allows greater flexibility
 - Access to continuous integration (Jenkins CI)
- Transition analysis software distribution to Conda
- Static software (pipeline) will be maintained in containers as underlying operating systems become obsolete
- Special activities (e.g. leap second implementation) will likely require expertise & training past the transition date



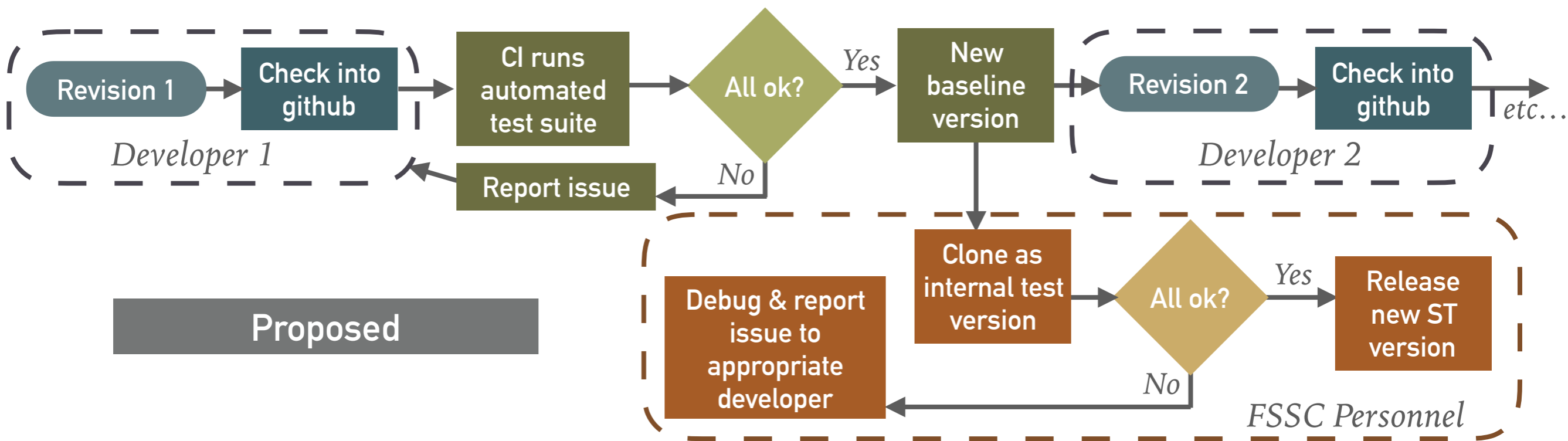
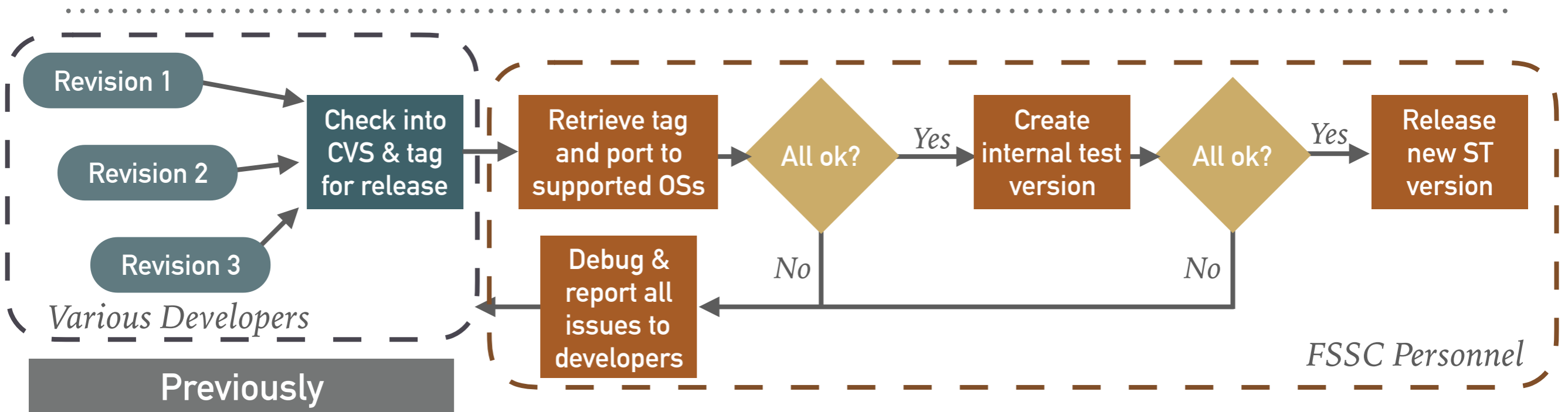


NEW SOFTWARE MANAGEMENT PARADIGM





NEW SOFTWARE MANAGEMENT PARADIGM





TRANSITION TIMELINE

- Initiated January 2017
- Software Weeks: Face-to-face meeting of principal actors
 - February 2017 - Assign transition roles, initial training
 - September 2017 - Intensive training, documentation
 - January 2018 - Readiness for shadow operations
 - Late summer 2018 - Readiness for final transition
- Transition to be completed by October 1, 2018

