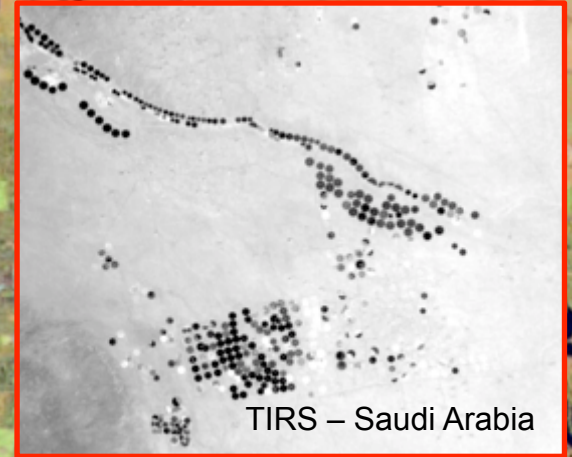




Earth Science

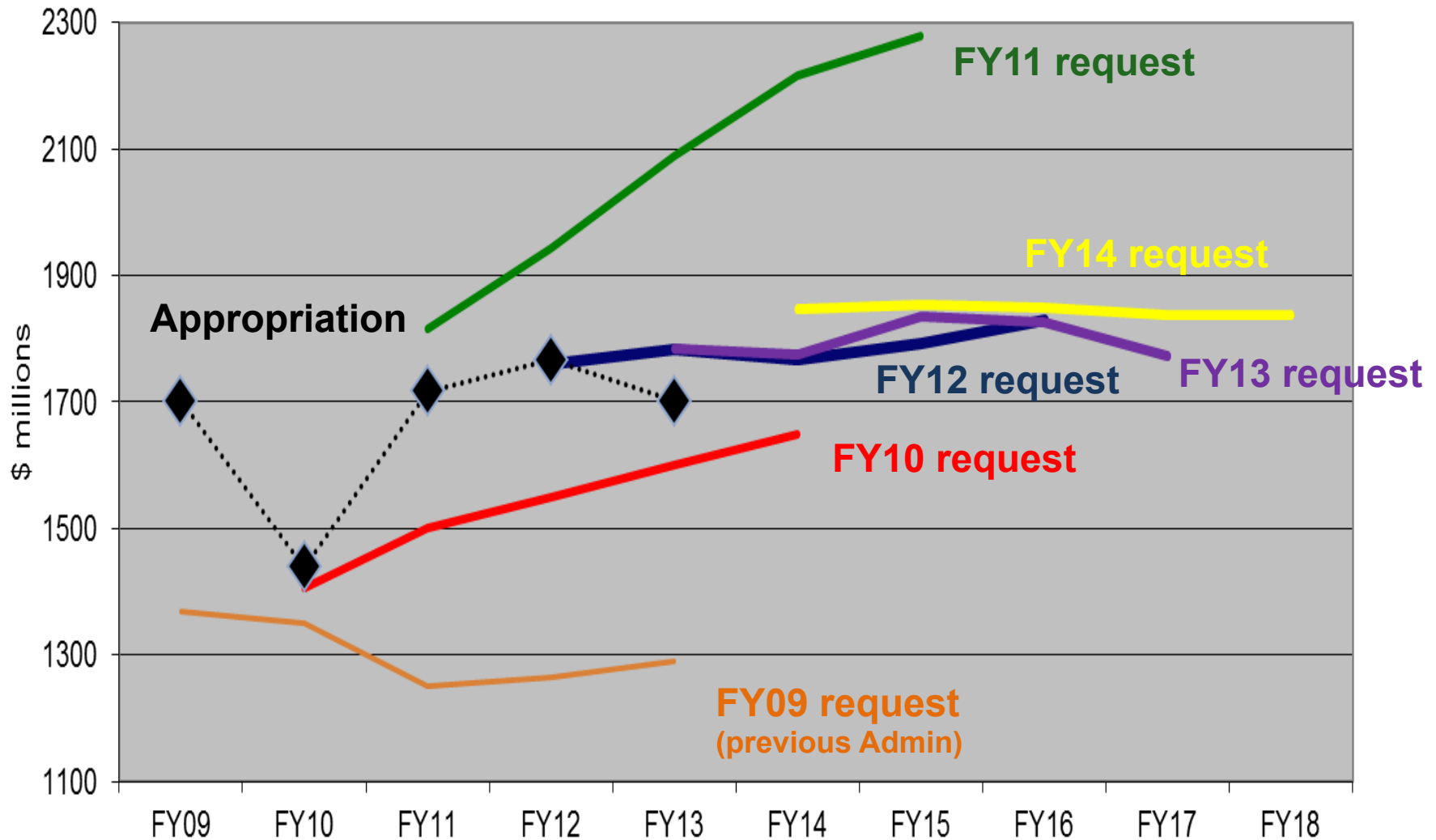
Overview of the
President's
FY 2014 Budget
Request



TIRS – Saudi Arabia

LDCM First-Light
OLI False-Color
Fort Collins area

Earth Science Budget – FY14 Request



Science Budget Request Summary

	FY2012	* FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
Science Total	5073.7	5115.9	5017.8	5017.8	5017.8	5017.8	5017.8
<u>Earth Science</u>	<u>1760.5</u>		<u>1846.1</u>	<u>1854.6</u>	<u>1848.9</u>	<u>1836.9</u>	<u>1838.1</u>
Earth Science Research	441.1		443.3	483.1	483.4	485.1	476.5
Earth Systematic Missions	879.9		787.5	811.2	861.9	839.1	833.3
Earth System Science Pathfinder	183.3		353.6	293.1	232.2	237.4	250.0
Earth Science Multi-Mission Operations	168.6		171.7	174.3	177.9	179.0	182.0
Earth Science Technology	51.2		55.1	56.2	55.1	56.1	56.1
Applied Sciences	36.4		35.0	36.7	38.4	40.1	40.1

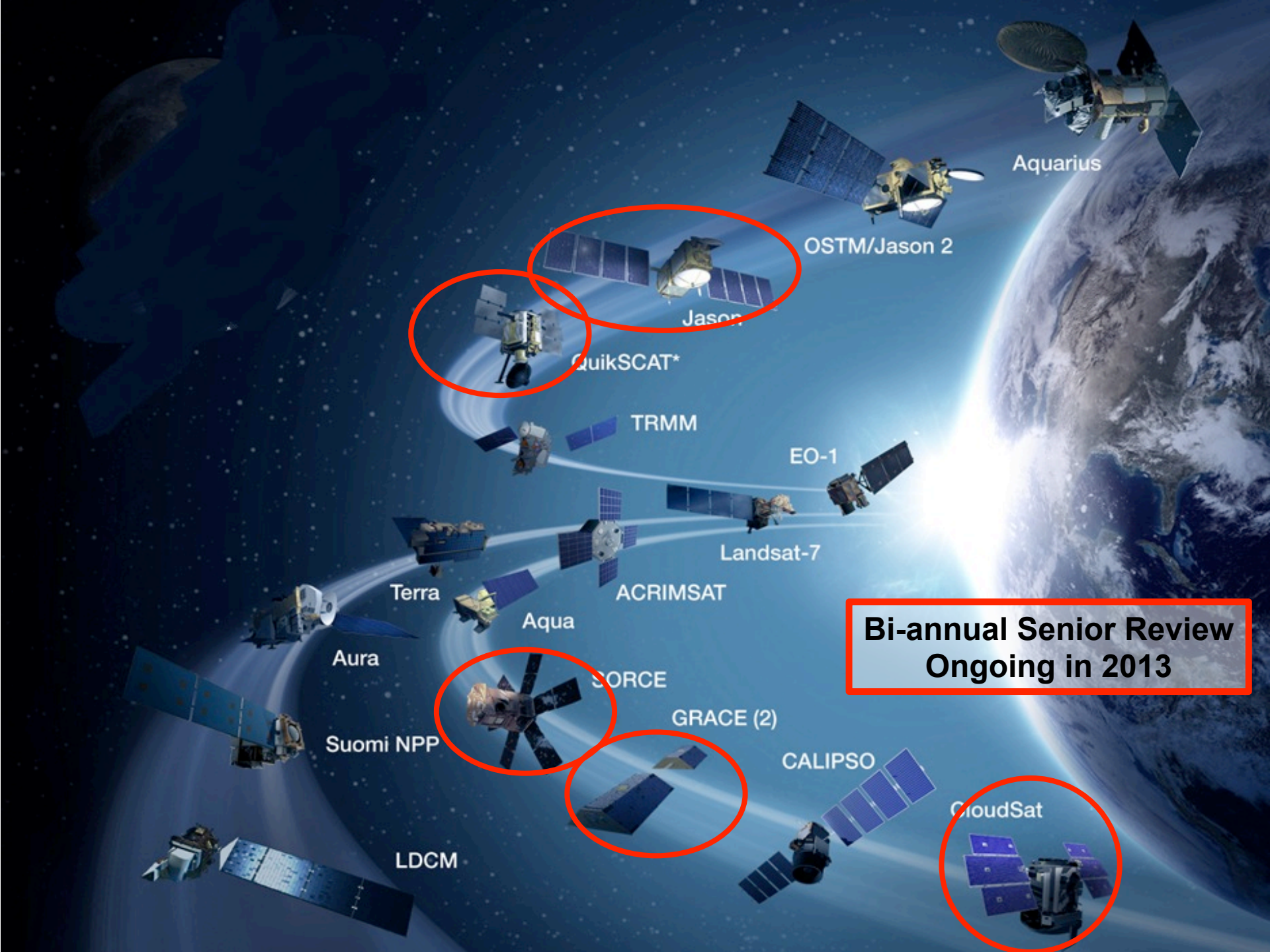
FY 2015-FY 2018
estimates
are notional

FY13 numbers are
not shown, and not
fully determined at
this time

Earth Science Budget Features

- Initiates new Land Imaging project for development of a national sustained Land Imaging Satellite System (with USGS)
- Expands Venture-Class competitive flight program
- Initiates **development of a program** for TSIS, OMPS-Limb, and “CERES” measurements starting in the JPSS-2 time frame – ex-NOAA climate sensors
- Completes integration of DSCOVR Earth observing instruments (EPIC and NISTAR) and initiates ground data system development in preparation for 2014 launch
- Ops funding for QSCAT, Jason-1, CloudSat, GRACE, SORCE in FY14 – ends all by FY18

- Advances development of SMAP, SAGE III/ISS, GRACE-FO, SWOT, CYGNSS, OCO-3, TEMPO, and ICESat-2 for launch before 2021
- Pre-formulation studies will continue for PACE, L-band SAR, and other Decadal survey-recommended and climate architecture missions
- Funds Carbon Monitoring System at \$10M/year
- E/PO funding removed – GLOBE “protected”
- Space Geodesy acceleration for station final development/test



Aquarius

OSTM/Jason 2

Jason

QuikSCAT+

TRMM

EO-1

Landsat-7

ACRIMSAT

Terra

Aqua

Aura

SORCE

GRACE (2)

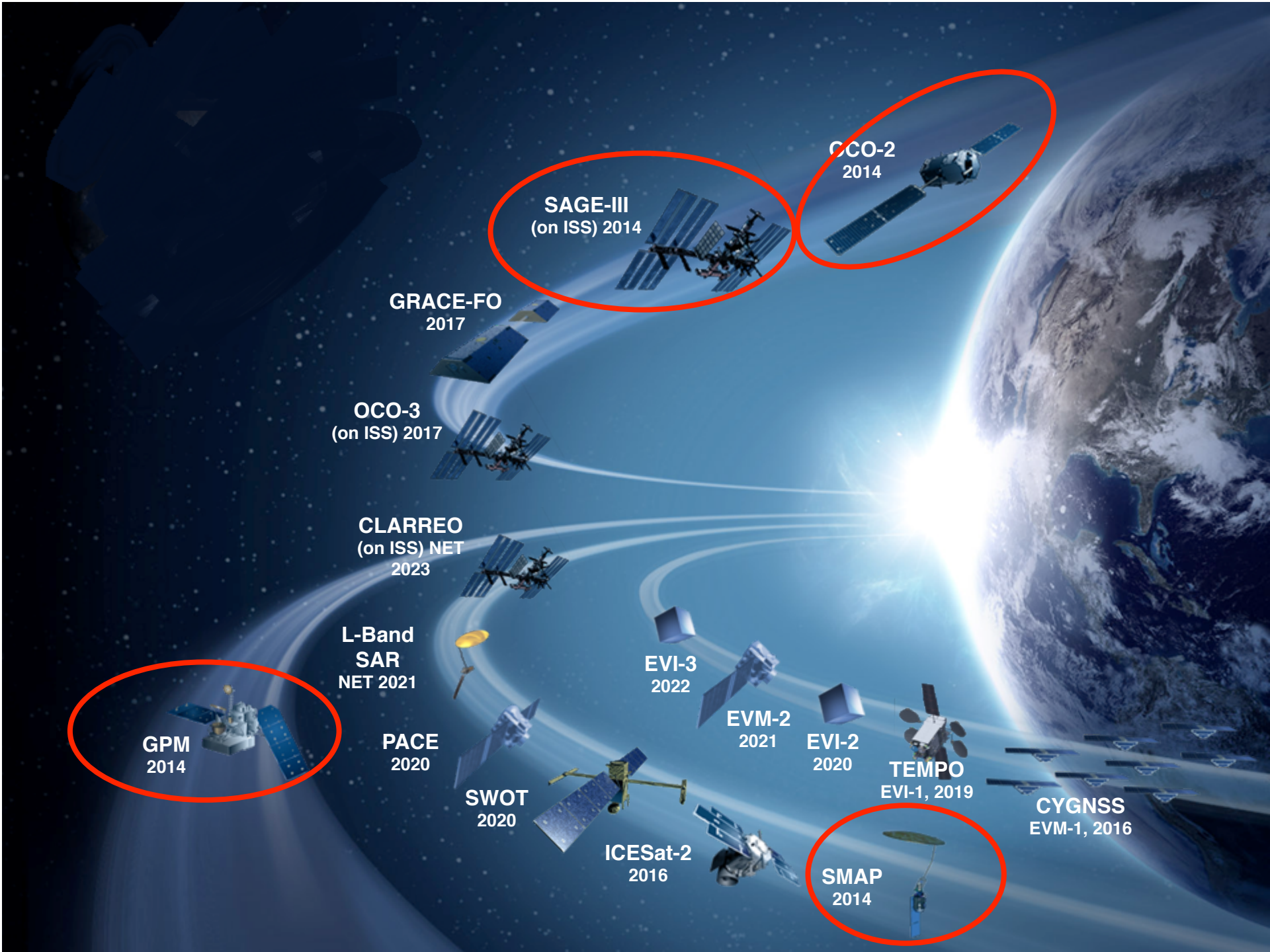
CALIPSO

CloudSat

LDCM

Suomi NPP

**Bi-annual Senior Review
Ongoing in 2013**



OCO-2
2014

SAGE-III
(on ISS) 2014

GRACE-FO
2017

OCO-3
(on ISS) 2017

CLARREO
(on ISS) NET
2023

L-Band SAR
NET 2021

EVI-3
2022

EVM-2
2021

EVI-2
2020

GPM
2014

PACE
2020

SWOT
2020

ICESat-2
2016

TEMPO
EVI-1, 2019

CYGNSS
EVM-1, 2016

SMAP
2014

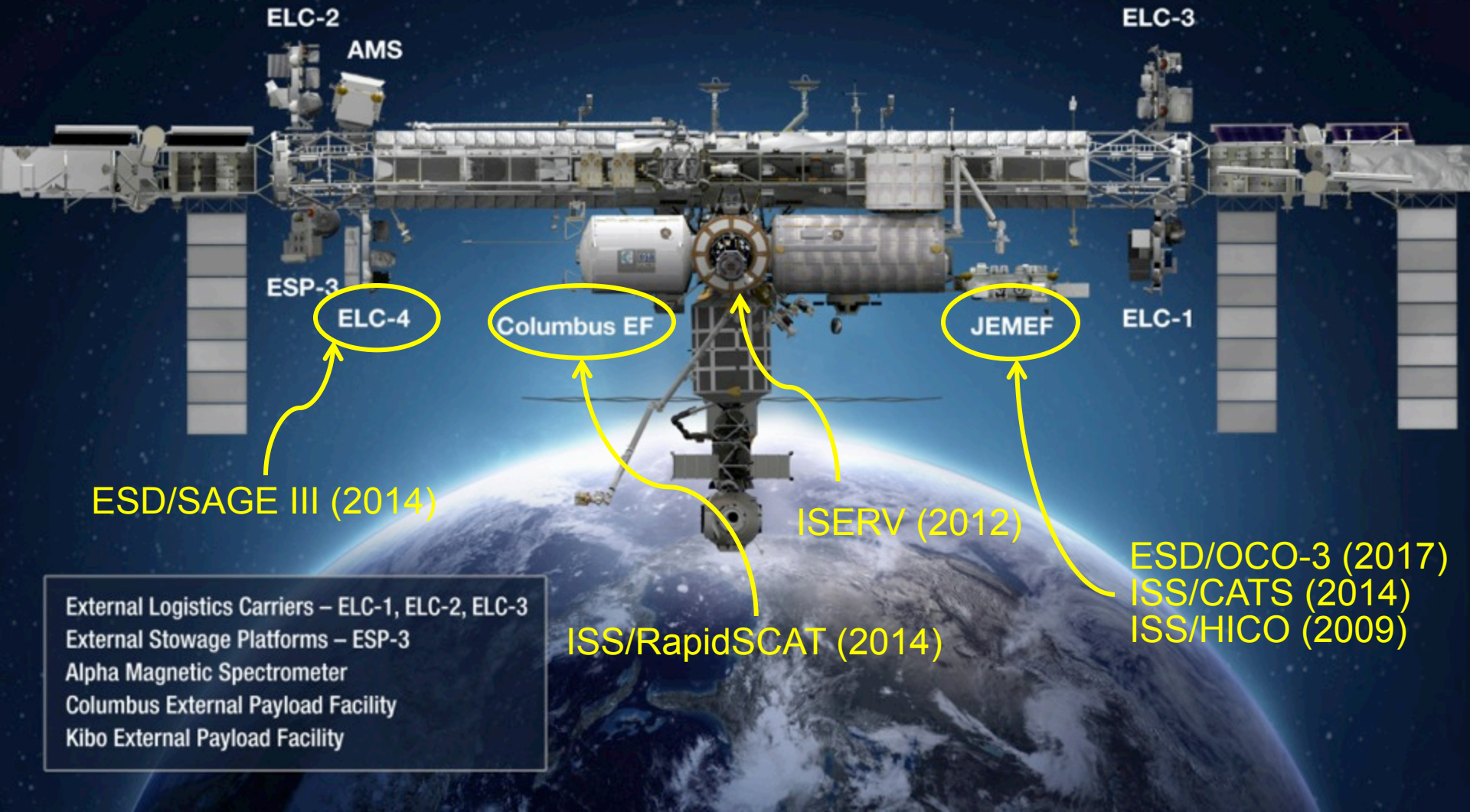
VENTURE-CLASS UPDATE/STATUS



- **EV-1 (“EV-S” - Suborbital, Airborne)**
 - All 5 investigations have completed at least 1 sustained field campaign
 - All EV-1 investigations will fly during 2013
 - **Second EV-S solicitation funded, in preparation for release on schedule in mid-2013**
- **EV-2 (“EV-M” - Small-sat)**
 - **CYGNSS PI team and NASA program office making good progress, under contract 7 Dec 2012 (planned 2016-2017 launch)**
 - ESD/SMD developing detailed “Class D” management approaches and processes
- **EV-I (Instrument)**
 - **TEMPO selected for GEO hosted payload opportunity (2017 launch)**
 - ESD initiating formal host selection/negotiation process
 - **Second “EV-I/2” solicitation funded, on schedule for release**

International Space Station

Earth Science Instruments



ESD/SAGE III (2014)

Columbus EF

JEMEF

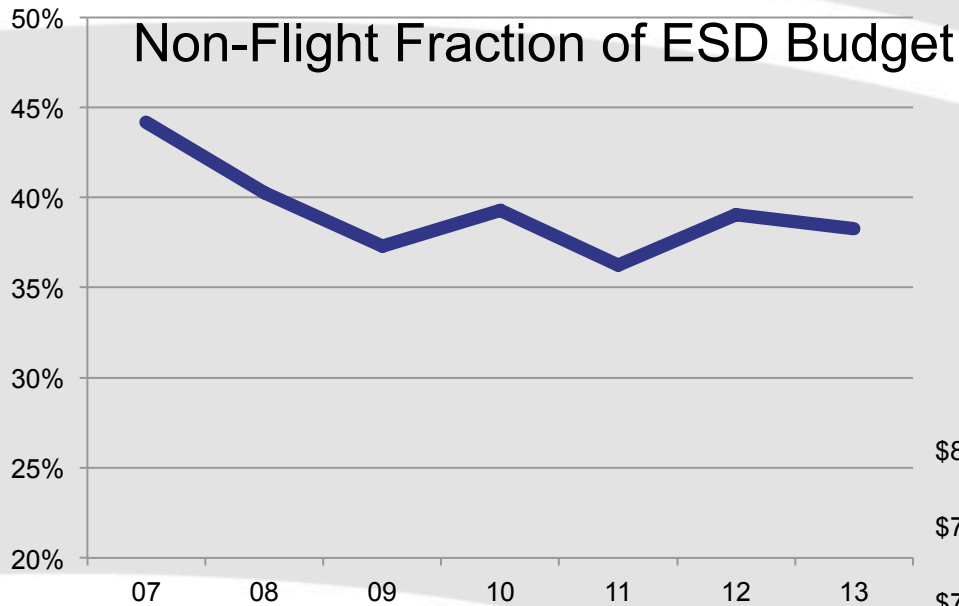
ISERV (2012)

ISS/RapidSCAT (2014)

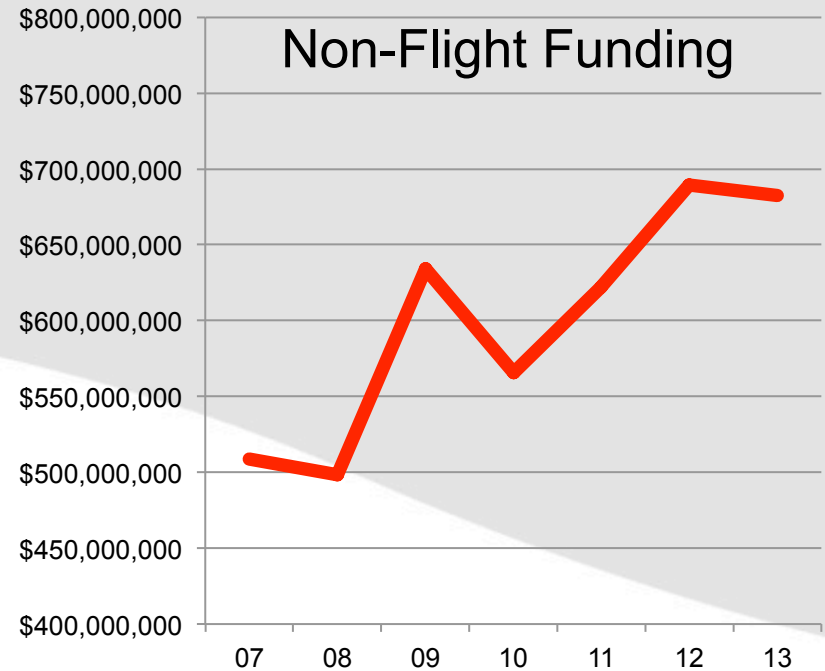
ESD/OCO-3 (2017)
ISS/CATS (2014)
ISS/HICO (2009)

External Logistics Carriers – ELC-1, ELC-2, ELC-3
External Stowage Platforms – ESP-3
Alpha Magnetic Spectrometer
Columbus External Payload Facility
Kibo External Payload Facility

Non-Flight Budgets: 2007-2013



- R & A
- Applied Sciences
- Technology
- Competed Science Teams



Earth Observations from the ISS: NASA/ESD Status and Plans



- On-orbit instruments funded by non-ESD sources, ESD funding for analysis
 - HICO (Hyperspectral Imager for the Coastal Ocean)
 - Launched September, 2009 on HTV; mounted on JEM-EF
 - ISERV (Digital Camera and Telescope)
 - Launched July, 2012 on HTV-3; mounted internally on WORF
- Planned instruments funded by NASA/HEOMD, ESD funding for analysis
 - CATS (Cloud-Aerosol Transport System for ISS)
 - LIDAR, summer 2013, HTV, JEM-EF
 - Rapid-Scat (Ku-band scatterometer)
 - Launch early CY2014, Falcon/Dragon
 - *Lightning Imaging Sensor (under consideration)*
 - *Hyperspectral Follow-on to HICO (under consideration)*
- Approved instruments funded by ESD
 - SAGE-III (Stratospheric Aerosol and Gas Expt)
 - In Phase-C; 12/2014 Launch on Falcon/Dragon; ESA provides hexapod pointing p'form
 - OCO-3 (*Orbiting Carbon Observatory-3 instrument only*)
 - *Phase-A November 2012; Launch Fall, 2017*

Reinvigorate On-Orbit Constellation (1 of 2)



- OSTM/Jason-2 Launched 6/2008
- ~~OCO~~ ~~Launched 2/2009~~ (LV Failure)
- ~~Glory~~ ~~Launched 3/2011~~ (LV Failure)
- Aquarius/SAC-D Launched 6/2011
- NPP Launched 11/2011
- LDCM Launched 2/2013

- GPM On Schedule for 2/15/2014 Launch
- OCO-2 On Schedule for 7/1-7/2014 Launch
- SMAP On Schedule for 10/31/2014 Launch
- SAGE-III/ISS On Schedule for 12/2014 Launch

Reinvigorate On-Orbit Constellation (2 of 2)



- GRACE-FO Formulation for launch 8/2016
- ICESAT-2 Confirmed for launch 12/2016
- CYGNSS (EVM) Formulation for launch late 2016/17
- OCO-3/ISS Formulation for launch 2017
- TEMPO (EVI) Formulation for launch 2017
- PACE Acquisition Strategy under evaluation, launch 2020
- SWOT Formulation for launch 2020