Climate and JPSS

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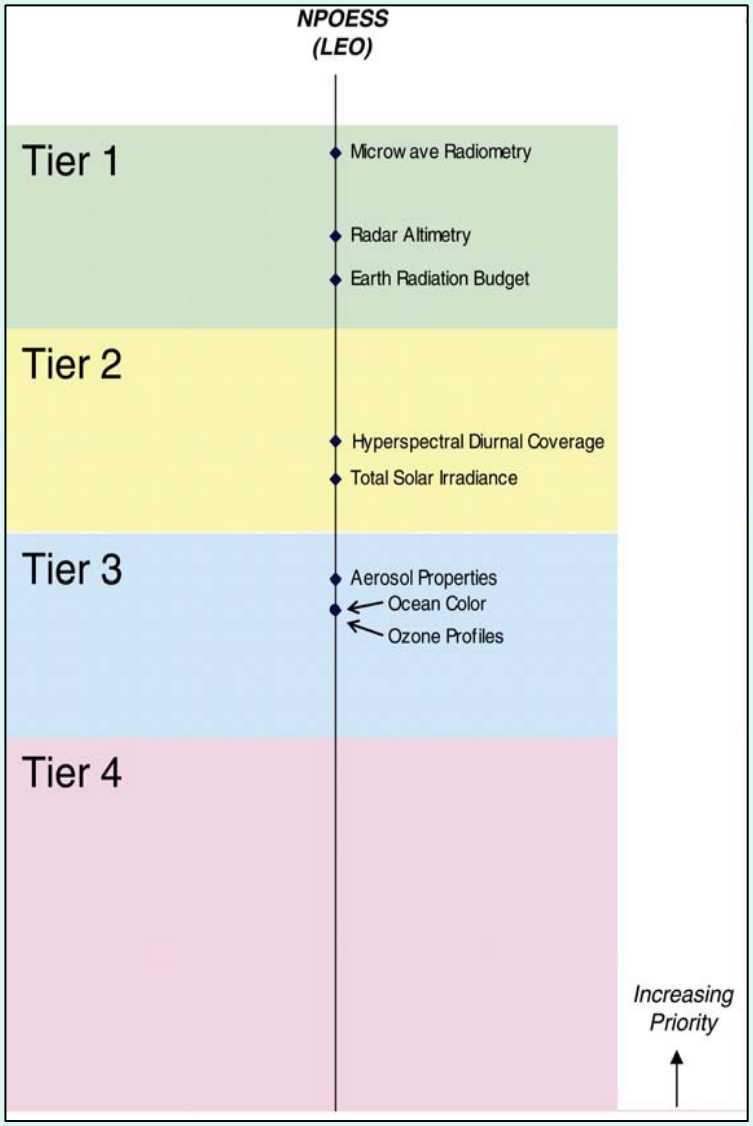
7 July 2010

Outline

- NOAA Climate Goal reaction to NRC “Ensuring the Climate Record…”
- Summary and status of NOAA’s CDR Program
- JPSS-specific CDR issues
- Progress in end-to-end and strategic planning

NOAA NESDIS & Climate Goal reaction to NRC "Ensuring the Climate Record…"



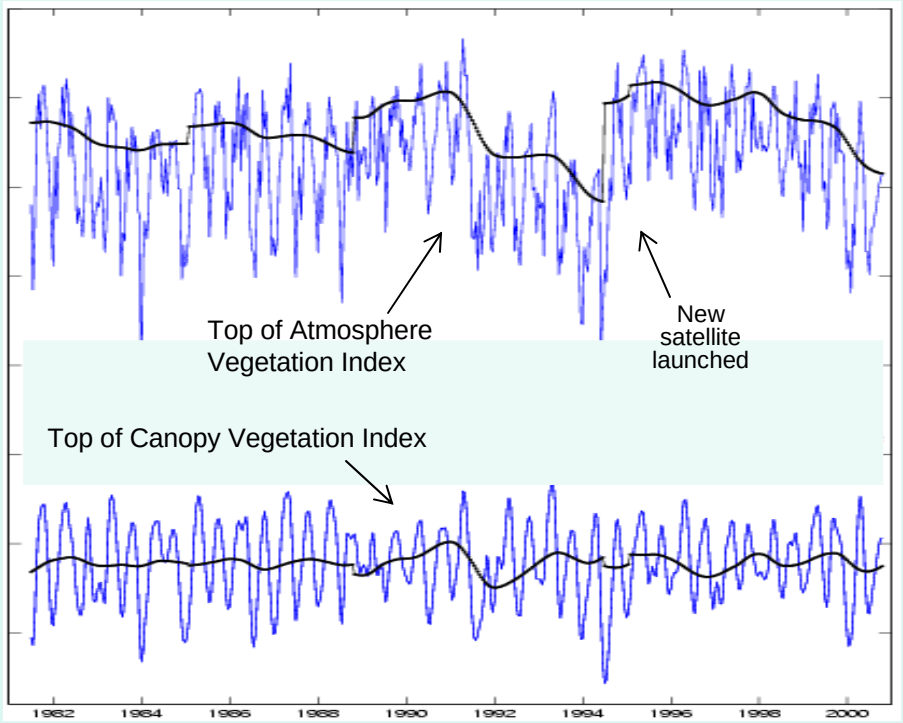
- Microwave CDRs funded
- Altimeter focus in FY11 FFO
- Clouds and radiation (ISCCP) reprocessing and R2O underway
- Hyperspectral being used to correct filtered radiometers
- Solar irradiance CDR funded
- Global aerosol CDR R2O
- Ocean color currently not funded CDR
- Ozone CDR team funded

NOAA NESDIS & Climate Goal reaction to NRC "Ensuring the Climate Record…"

- Clear Agency Roles and Responsibilities
  - Regular quarterly NOAA-NASA meetings and NOAA participation in CERES and SORCE science team meetings are helping
- International Coordination
  - NOAA provides international leadership through WMO GSICS & SCOPE-CM as well as CEOS Climate Ad hoc Group
- Community Involvement in the Development of Climate Data Records
  - Lots of community involvement – details in CDR section

CDRs Provide Scientifically Corrected Long Time Series for Climate Analysis

Uncorrected Data Time Series Contain Both Environmental Information and Satellite-induced Artifacts

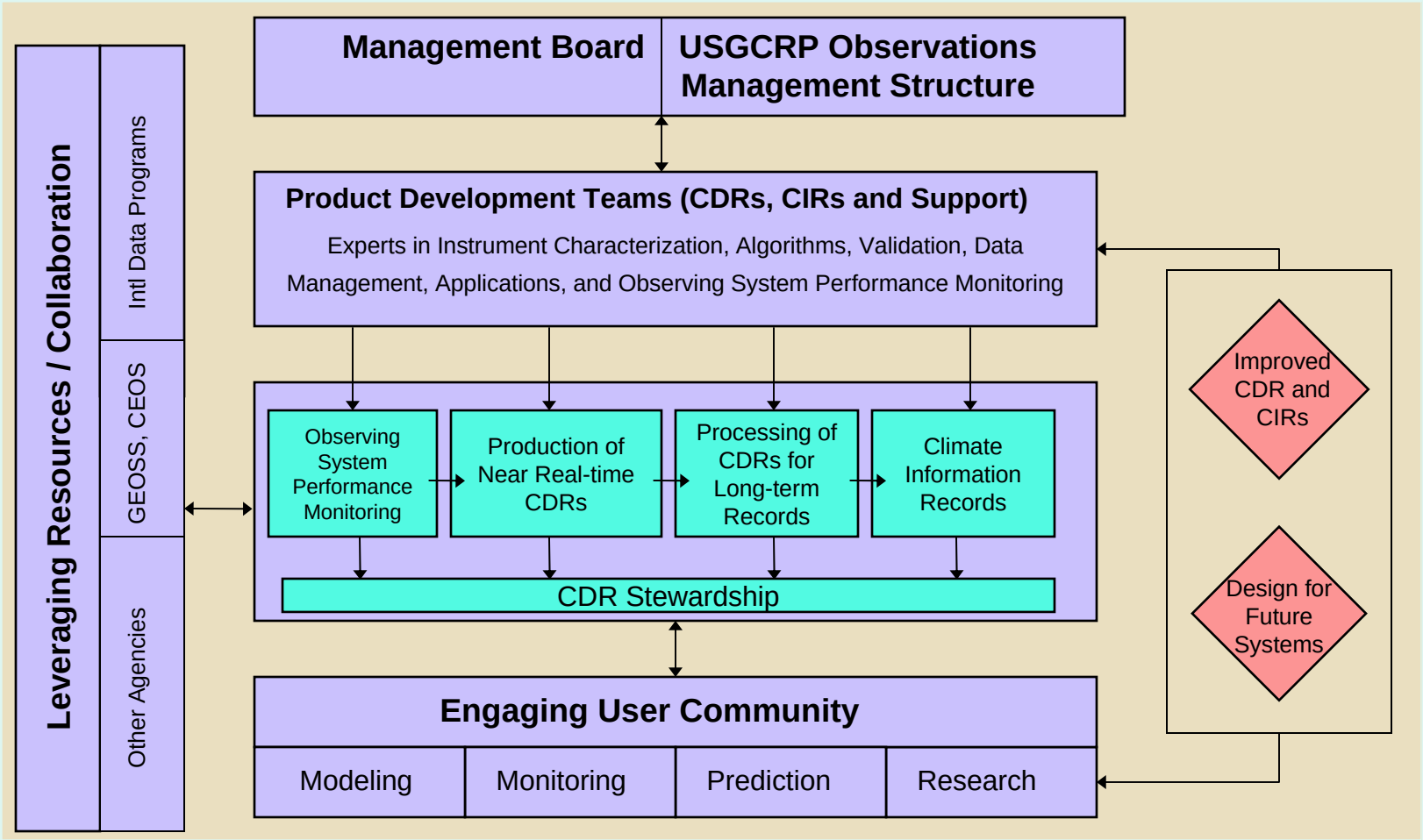


← Operational weather and hazard products are produced rapidly to potentially save life and property

Climate Data Records (CDRs) provide long term product consistency through rigorous reprocessing with advanced algorithms, ancillary data and evolved instrument understanding.

Climate Information Records (CIRs) provide specific information about environmental phenomena of particular importance to science and society (*e.g.*, hurricane trends, drought patterns)

CDR Program Functional Framework



CDR Program Funding Profile

Funding Mark or Source				
Fiscal Year	President's Budget Request ($M)	Appropriated ($M)	Redirected ($M)	ARRA ($M)
2007	0	0	3.5	0
2008	0	0	0	0
2009	0	0	2.9	5.0
2010	7.0	10.0	0	0
2011	18.0	*	*	*

* To Be Determined

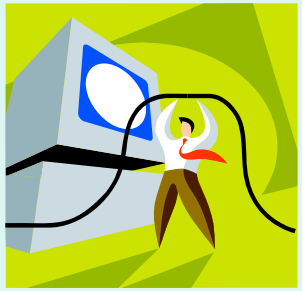
Achieving CDR Production

Development – User Products

Research-to-Operations

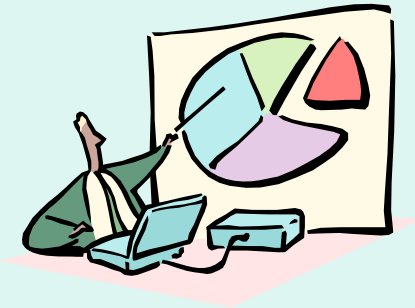
Integration & Outreach

Development – IT Systems

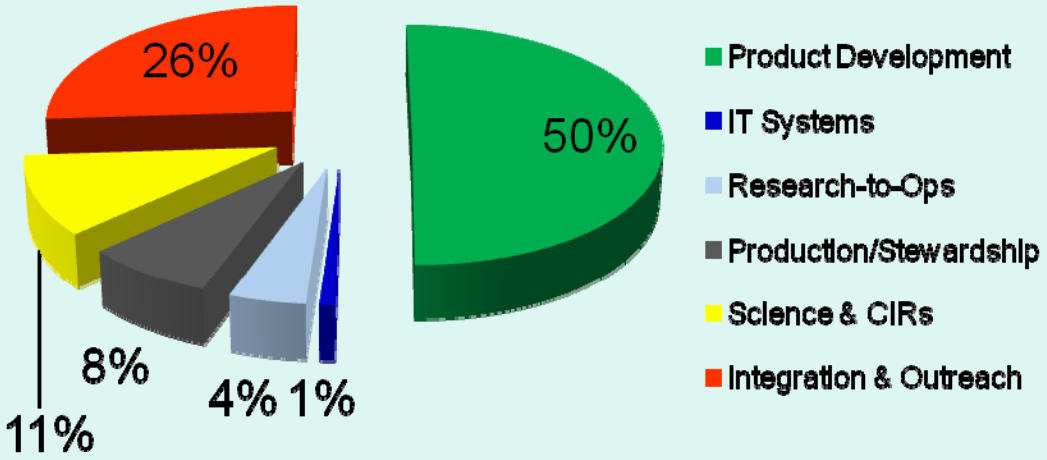


Production & Stewardship

User CIRs and Science



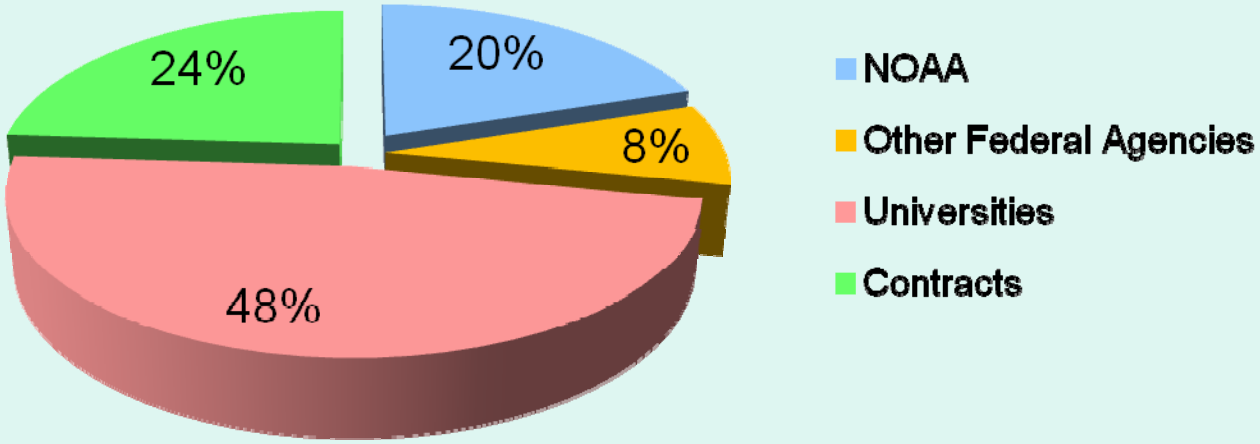
FY10 Investment Allocation*



ID	Activity	Investment ($M)	Investment (%)	FY11 Change(%)*
1	Development -- Products	5.1	50	⇨
2	Development – IT Systems	0.1	1	⇧
3	Research-to-Ops	0.4	5	⇧
4	Production and Stewardship	0.7	8	⇨
5	Science & CIRs	1.1	11	⇨
6	Integration & Outreach	2.6	26	⇩
		10.0	100	

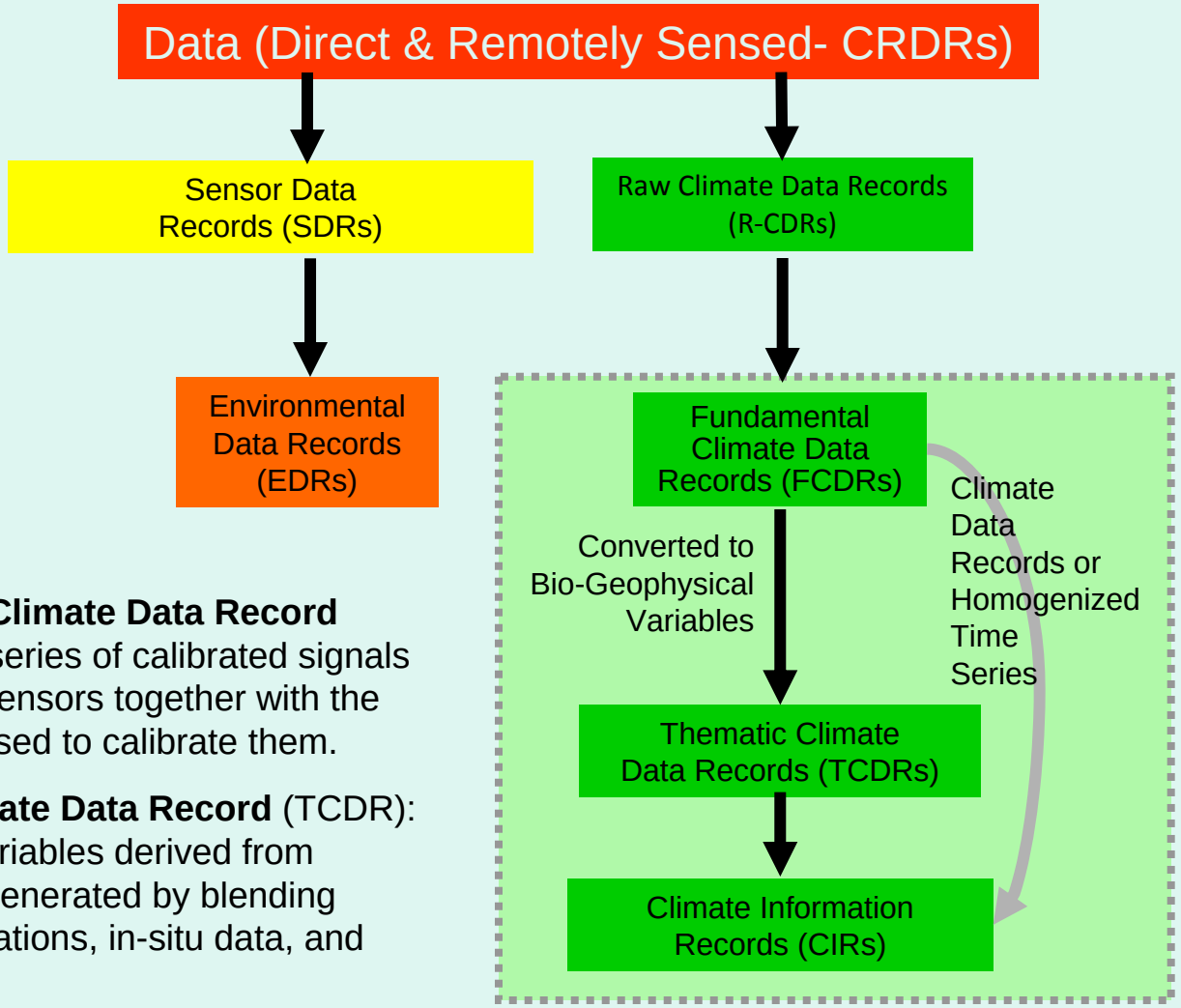
*Anticipated

FY10 Organization Allocation*



ID	Activity	Obligation ($M)	Obligation (%)
1	Other NOAA (BOPs)	1.3	13
2	Other Federal Agencies	0.7	7
3	Universities: CICS-NC	2.3	23
4	Universities: Other CIs	1.5	14
5	Universities: Non-CI	1.2	11
6	Contracts	2.3	24
7	FTEs (NCDC)	0.7	6
		10.0	100

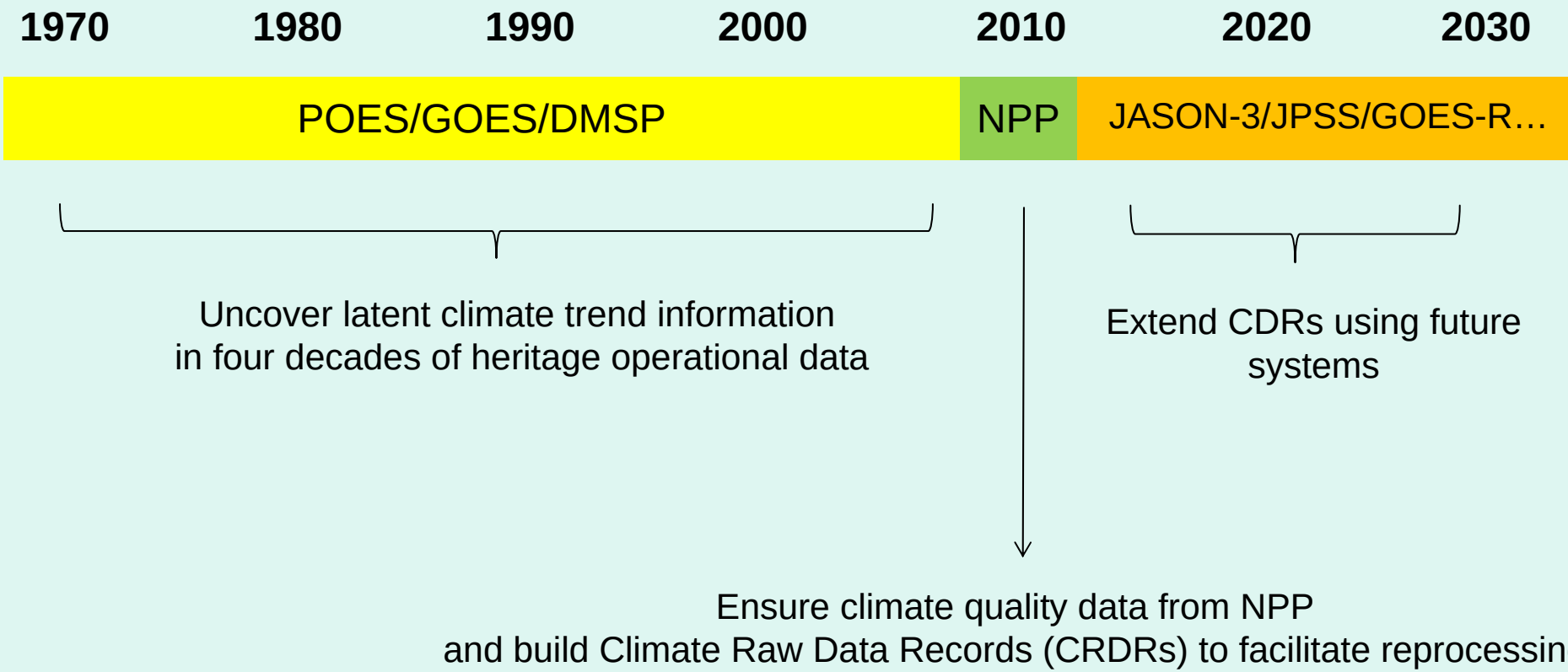
CDR Information Flow



Fundamental Climate Data Record (FCDR): Time series of calibrated signals for a family of sensors together with the ancillary data used to calibrate them.

Thematic Climate Data Record (TCDR): Geophysical variables derived from FCDRs, often generated by blending satellite observations, in-situ data, and model output.

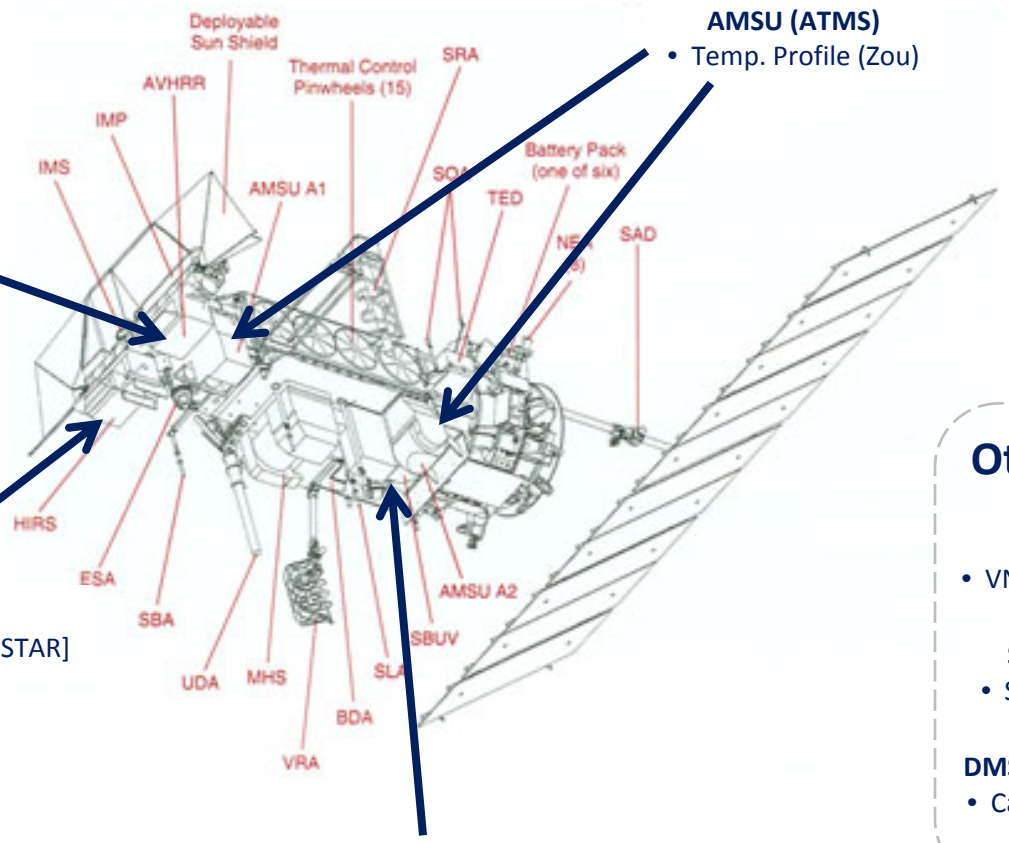
CDR Activities Address 3 Epochs



Historic POES-GEOS - Climate Sensor Coverage By New FY09 CDR Award

AVHRR (VIIRS)
- Snow/Ice (Key)
- Land/Carbon (Vermote)
- Thermal Calibration (Mittaz)
- VNIR Cal./Clouds (Minnis; FY10)

AMSU (ATMS)
- Temp. Profile (Zou)



HIRS (CrIS)
[Calibration development at STAR]

SBUV (OMPS)
- Ozone (Flynn)

Other Satellites

GOES: Imager (ABI)
- VNIR Cal./Clouds (Minnis)

SORCE, Glory (TSIS)
- Solar Irrad. (Pilewskie)

DMSP: SSM/I, SSMIS (MIS)
- Calibration (Kummerow)
- Snow/Ice (Key)

Arrows identify key climate instruments

Preparing for NPP -Climate Raw Data Record (CRDR) Development

Program Status

- System Definition Review (Completed: Mar. 2010)
  - Requirements, Management Plan, and Technical Approach
- Next Milestone – Critical Design Review
  - June 2010

Program Risks

- Complexity of the NPP/NPOESS RDRs and short schedule
- Staffing needs for CrIS, ATMS, and OMPS NP Raw CDRs and dissemination

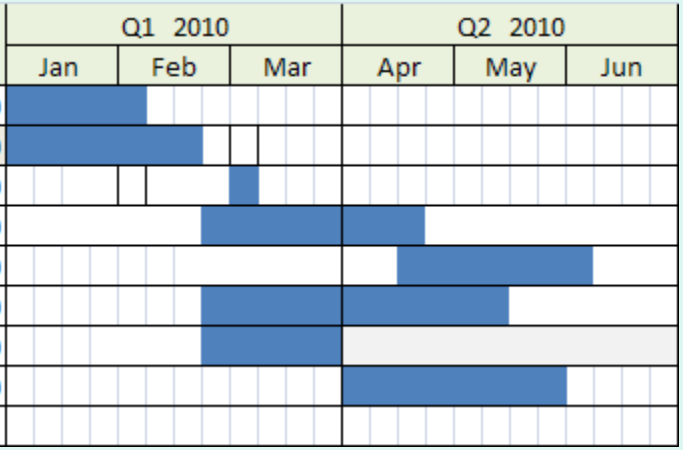
Program Accomplishments

- Utilizing NASA Science Data Segment Land PEATE software ported from IDPS
- Collaborate with the Land PEATE to develop additional capabilities

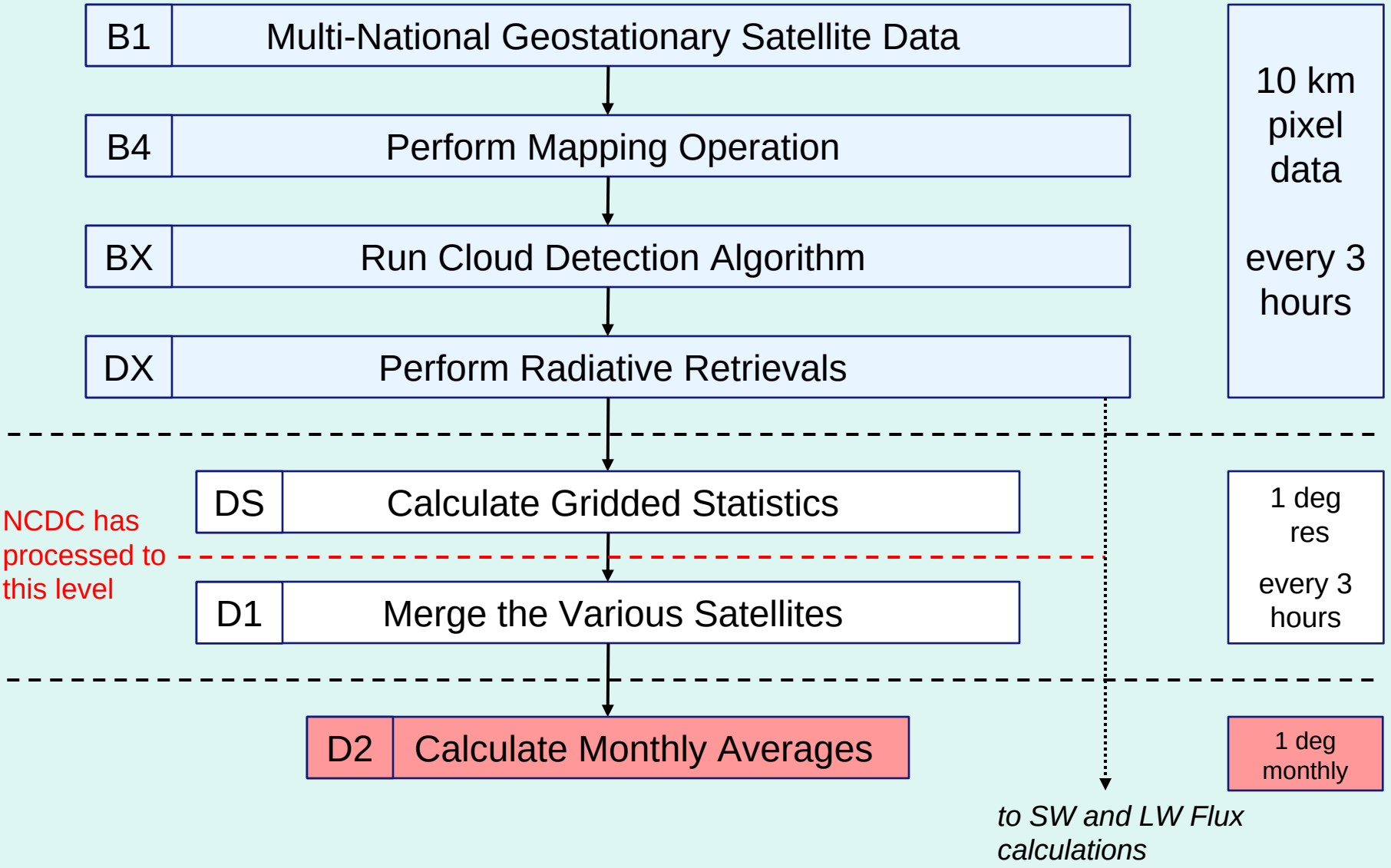
NPP Operational Software Reuse

Program Schedule

ID	Task Name	Status	Start	Stop
1	Define System Requirements	Complete	11/23/2009	2/5/2010
2	Analyze System Capabilities	Complete	11/23/2009	2/20/2010
3	Conduct SDR	Complete	3/4/2010	3/4/2010
4	Design VIIRS Processing		2/26/2009	4/22/2010
5	Define VIIRS Raw CDR		4/23/2010	6/4/2010
6	Design Ingest		2/26/2010	5/13/2010
7	Design Dissemination		2/26/2010	3/25/2010
8	Design Processing Framework		4/2/2010	5/27/2010
9				



Preparing for CERES - ISCCP Reprocessing Data Flow



JPSS-Specific Issues

- NASA missions are end-to-end and NOAA are broken into segments
  - NOAA has mapped one to the other and found gaps that are being addressed
    - Sensor integration and testing
    - Instrument scientist and analyst
    - Sensor cal/val teams
    - CDR legacy processing not portable

End-to-End Stewardship

END-TO-END STEWARDSHIP OF NOAA SATELLITE OBSERVATIONS										
REQUIREMENT	INPUT/OUTPUT	QUALITY ASSURANCE				ARCHIVAL			OUTCOMES & IMPACTS	
ESSENTIAL CLIMATE VARIABLE	OBSERVING SYSTEM OR SENSOR	INSTRUMENT HEALTH MONITORING	RAW DATA RECORDS	ENVIRONMENTAL DATA RECORDS	CALIBRATION & VALIDATION	ARCHIVE STEWARDSHIP	CLASS IT DEVELOPMENT	CLASS OPERATIONS	CLIMATE DATA RECORDS	CLIMATE SERVICES: MONITORING UNDERSTANDING MODLEING
Upper Air Temp, SST, Clouds, Sea Ice…	NPP / JPSS	PARTY RESPONSIBLE								
ERB/TSI, Ozone	Climate Sensors (TSIS, CERES, OMPS)									
Cloud Properties	GOES-R									
Sea Level	JASON-3									
Surface Wind	OSVW (Quickscat replacement)									
Precipitation	GCOM-W AMSR-2									
Ocean Color	GCOM-C SGLI									
Upper Air Temperature	COSMIC-2 / GPS-RO									

NOTIONAL SAMPLE

Long-Term Planning

- NOAA is initiating long-term planning by initiating community requirements meetings
  - Continuity of Earth Radiation Budget (CERB) next week in Asheville
- NOAA is working with the international community to coordinate efforts
  - The aim of the WMO **S**ustained, **C**o-**O**rdinated **P**rocessing of **E**nvironmental Satellite Data for **C**limate **M**onitoring (SCOPE-CM) is to establish a network of facilities ensuring continuous and sustained provision of high-quality satellite products related to the Essential Climate Variables (ECV), on a global scale, responding to the requirements of the Global Climate Observing system (GCOS).
  - Committee on Earth Observing Satellites Climate Ad hoc Group (CEOS-CAG) - The group should ensure the more coherent product of FCDR/ECVs among agencies in response to the defined needs of GCOS

Conclusions

- NOAA has successfully recovered most climate sensors and added CDR processing capabilities
- NOAA's CDR Program has resources and is actively engaging the U.S. and international climate communities in sustaining climate observations, data production and services
- JPSS gaps in climate information stewardship have been identified and are being addressed