The National Earth System Prediction Capability (National ESPC)

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What is National ESPC?

- An integrated National Capability meeting the U.S. Federal need for Earth System Prediction for the provision of operational products and services
  - For the protection of life and property in the US
  - For the economic development, aviation, maritime, shipping, agriculture of the US
  - National defense and homeland security (World Wide)
  - Strategic decision making
- Includes:
  - Near term, medium range and extended range weather (< 90 days)
  - Seasonal and inter-annual climate (90 Days+)
  - Sub-decadal to decadal
- Leverages existing and planned Agency operational capabilities, and research and development programs and projects
- Work within mission of each agency, to further a national goal towards which each agency contributes

Effort is broadly consistent with WMO's S2S Prediction Plan and various national reports.

Strong need Identified for Inter-Agency Coordination

Building a National ESPC

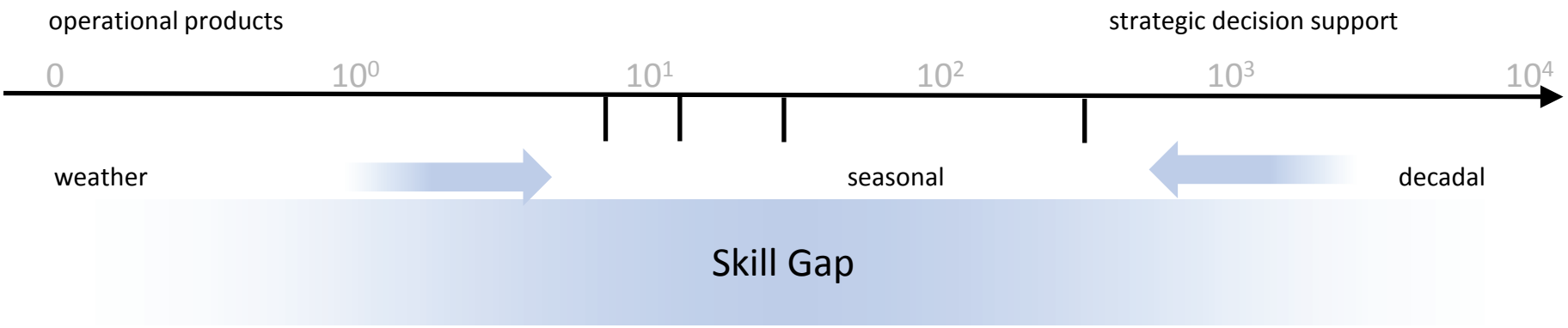
- Develop and implement a common or coordinated prediction technology through
  - An affiliation of existing Programs, Projects, Laboratories, Centers
- Cooperative effort of the participating federal environmental research and environmental operational guidance agencies
  - Multiple offices and laboratories within each agency
  - Application of significant internal & external research and development funding
- Focus on meeting needs of user community through existing and planned agency operational numerical prediction capabilities through coordinated R&D and Operations

Coordination of Existing and Planned Agency Capabilities

Where we are

- Operational Global Weather Ensemble
  - 63 member, multi-model, > 80 variables, out to 16 days, with skill at 11+ days, at 1 degree resolution - going to ½ degree, adding variables, will do extended runs to 32 days
- Operational Multi-model Ensemble for Sub-seasonal and Seasonal Prediction
- Earth System Modeling Framework - Common Model Architecture
- In-place Coordinating Structure – Project Office
  - Executive Steering Group
  - Multiple committees - agencies regularly interacting to solve problems in a common way.

Bridging the Gap



- To extend weather skill past traditional weather scales:
  - Fully coupled air-ocean-land-ice modeling systems needed
  - Multi-model ensembles
  - Improved data assimilation techniques, particularly for ocean-land-ice
- To improve climate model skill at subseasonal scales:
  - Data assimilation, reanalysis/reforecast
  - Process representation

Needed across time scale:

- Improved HPC utilization, incl. advanced architectures
- Common model architectures
- Multi-model ensemble management
- Uncertainty depiction; metrics suited for longer time scales
- Product creation

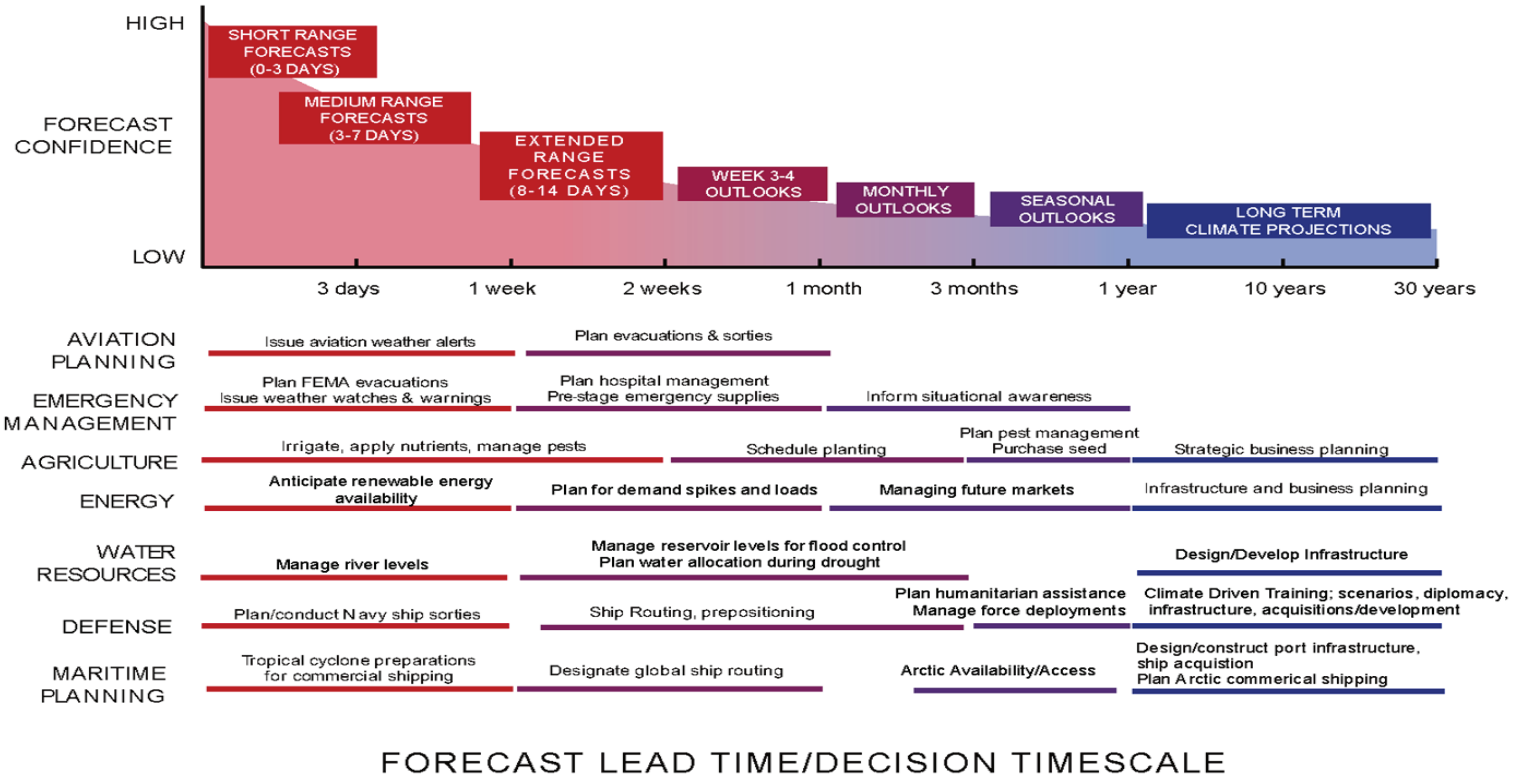
- Research agencies: work within mission expertise to improve skill
- Operational agencies: exploit the research for skill improvements
- *Need strategic-level coordination of issues*

Mission Needs

The National ESPC collected Agency missions needs across timeframes in order to know where to look for skill.

- Examples
  - Severe weather and high-impact events/potential
  - Temperature, precipitation, pressure, etc. (extremes)
  - Pollen forecast outlook
  - Sub-surface freeze/thaw patterns
  - Ocean current speed/direction
  - Stream flow, soil moisture, and deficit and runoff
  - Snow density and presence of ice layers
- Feedback from Agencies
  - Air Force
  - EPA
  - FHWA
  - Navy
  - NOAA
  - NPS
  - USDA

Mission Needs

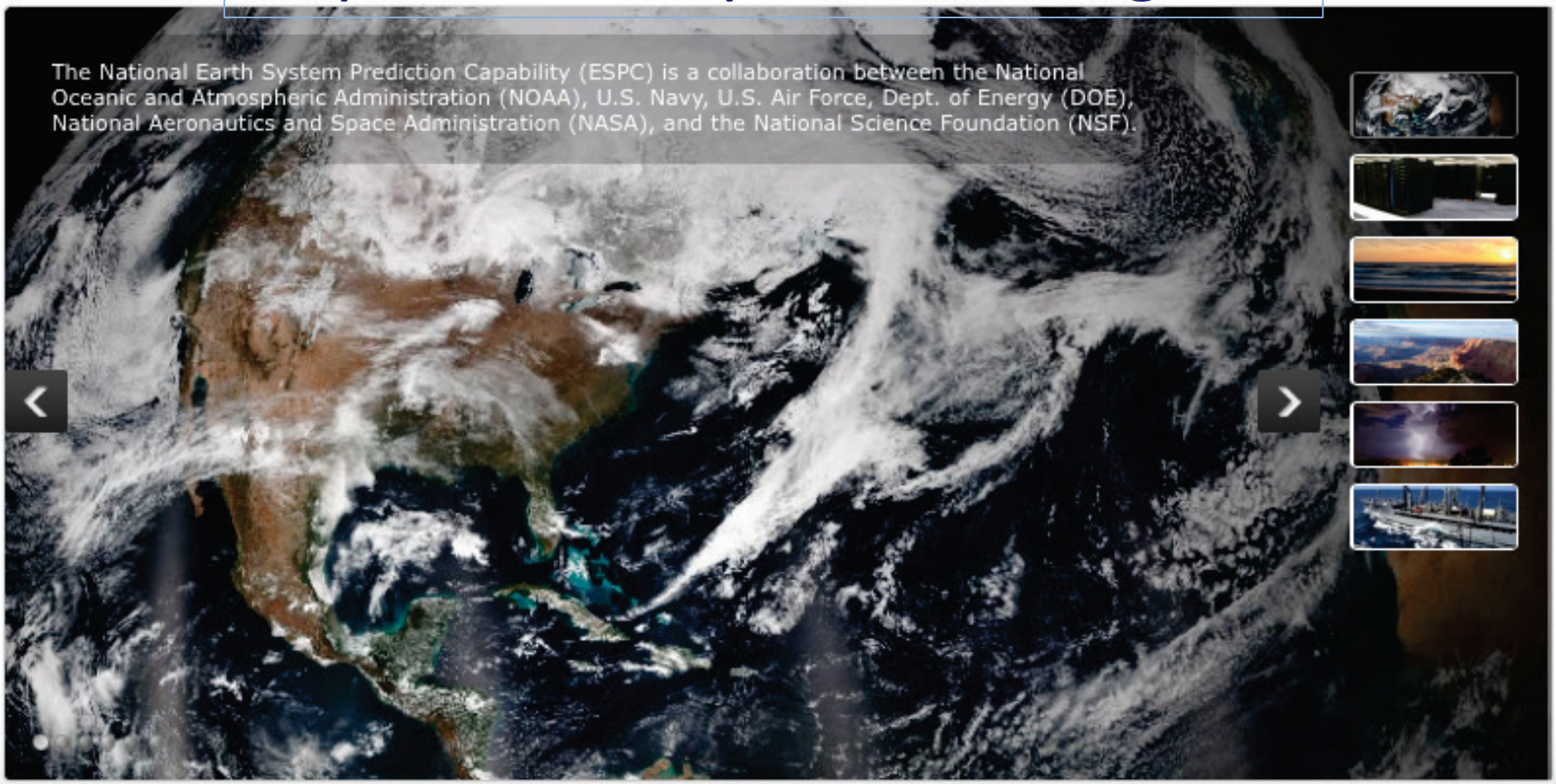


FORECAST LEAD TIME/DECISION TIMESCALE

National ESPC
Earth System Prediction Capability

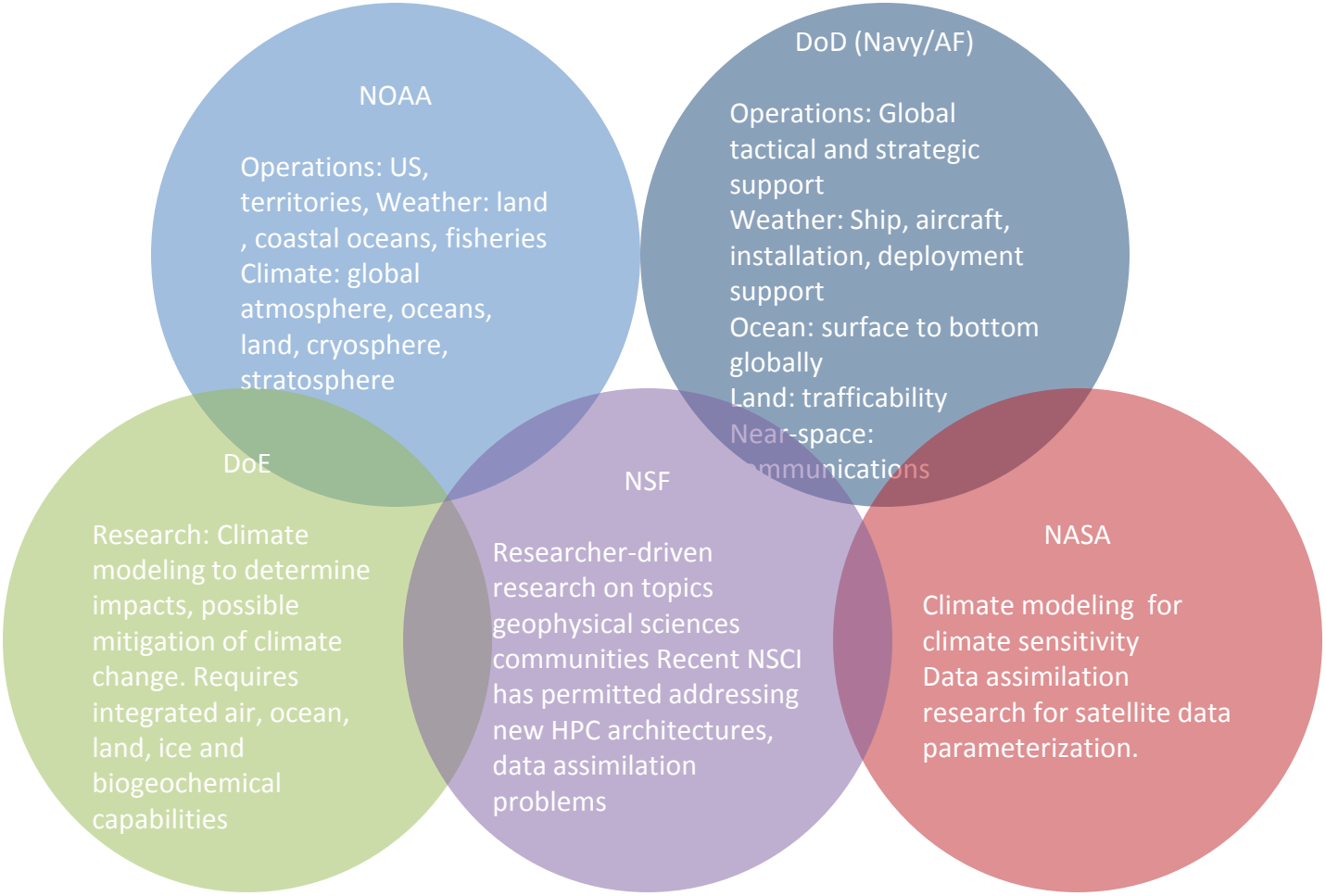
HOME | ORGANIZATION | DOCUMENTS | WORKING GROUPS | FOCUS PROJECTS | CALENDAR

http://www.espc.oar.noaa.gov/



Backup Slides

Agency Roles and Responsibilities



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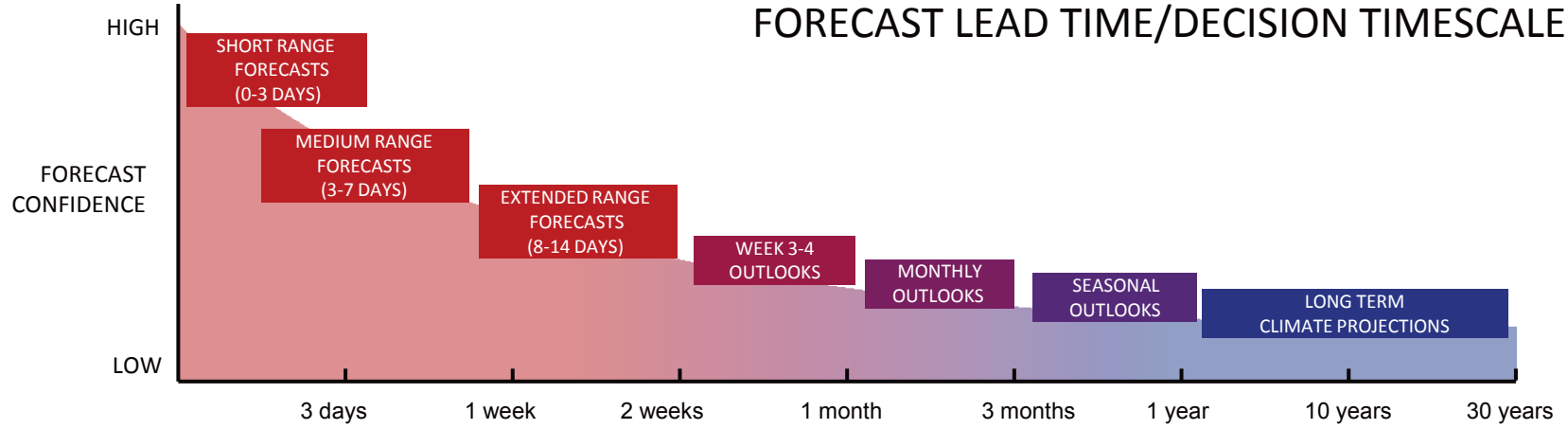

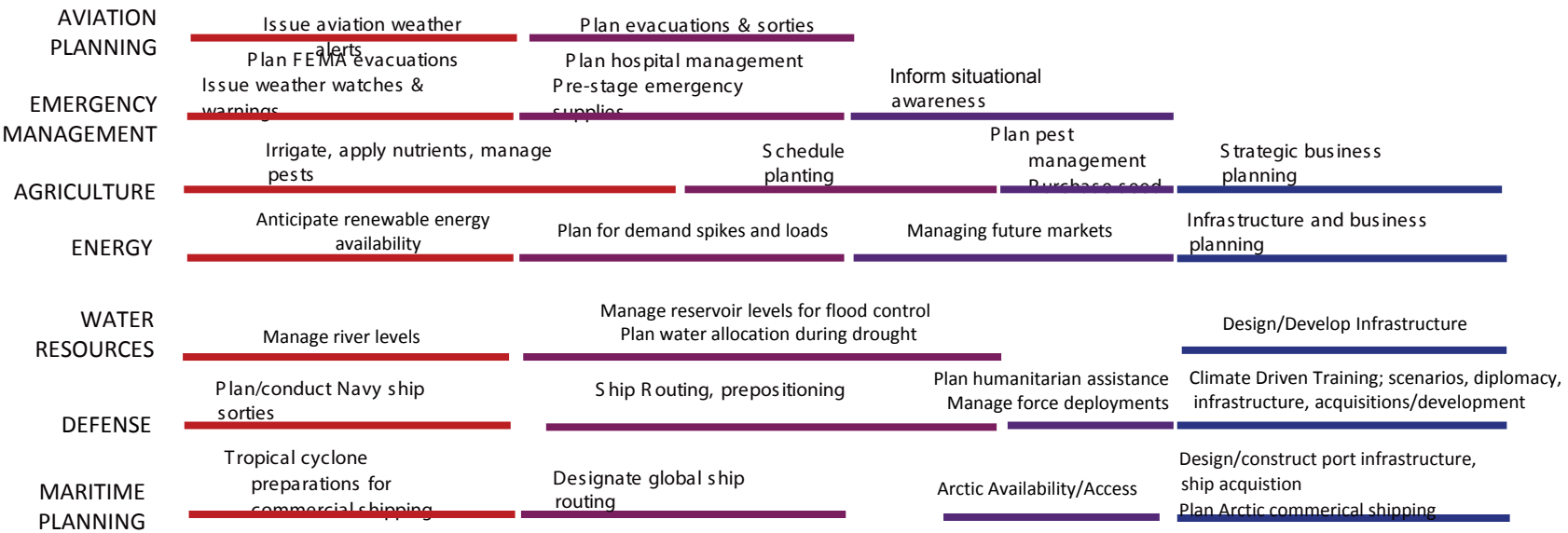

Unified Roadmap

- Notional display of time coverage, agency plans over different parts of the timescale
- High-level: focus on common/bridging initiatives, rather than repeating individual model upgrade plans

National ESPC Roadmap: Synoptic (0-16 days)

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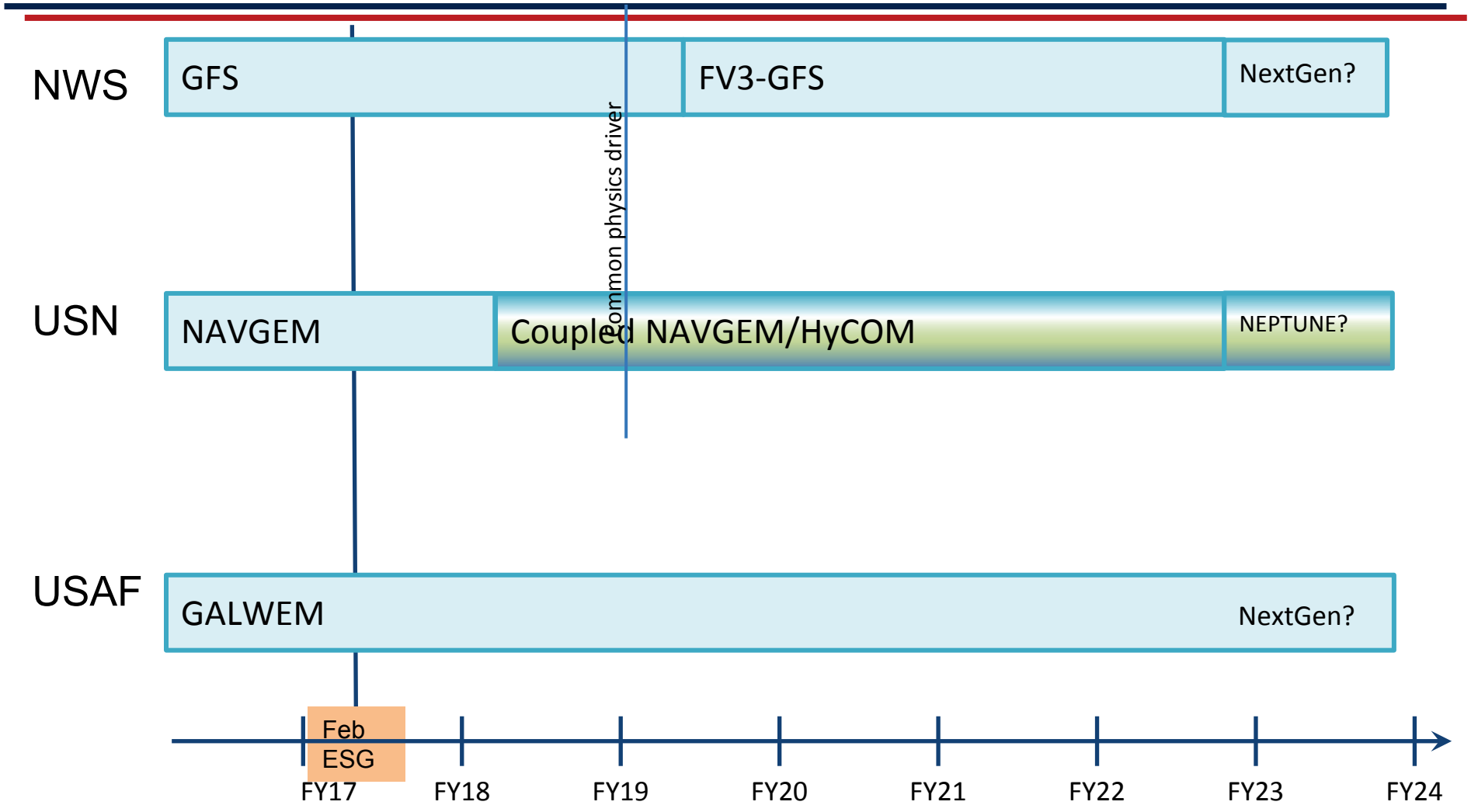

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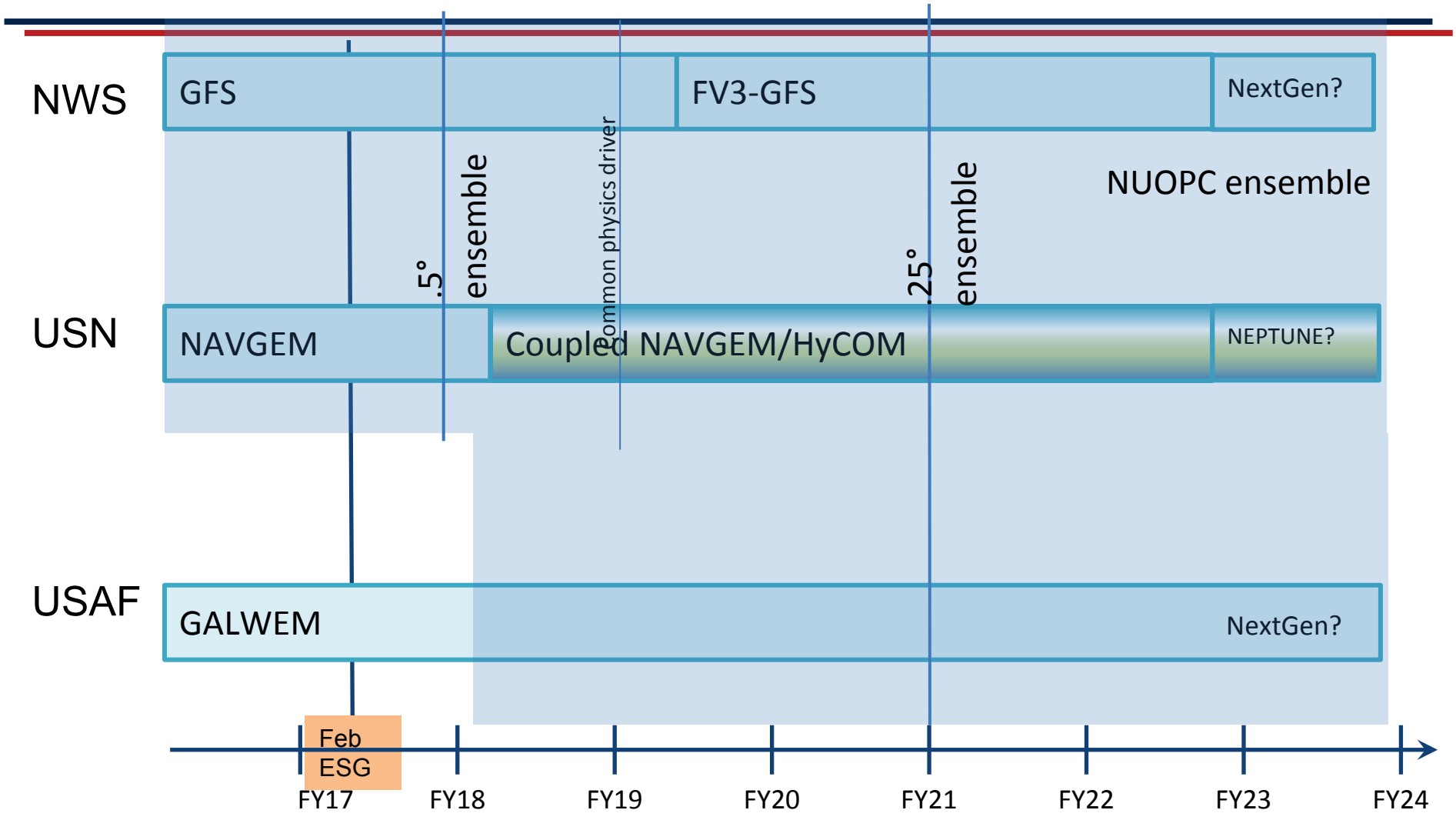

National ESPC Roadmap: Sub-Seasonal (14-45 days)

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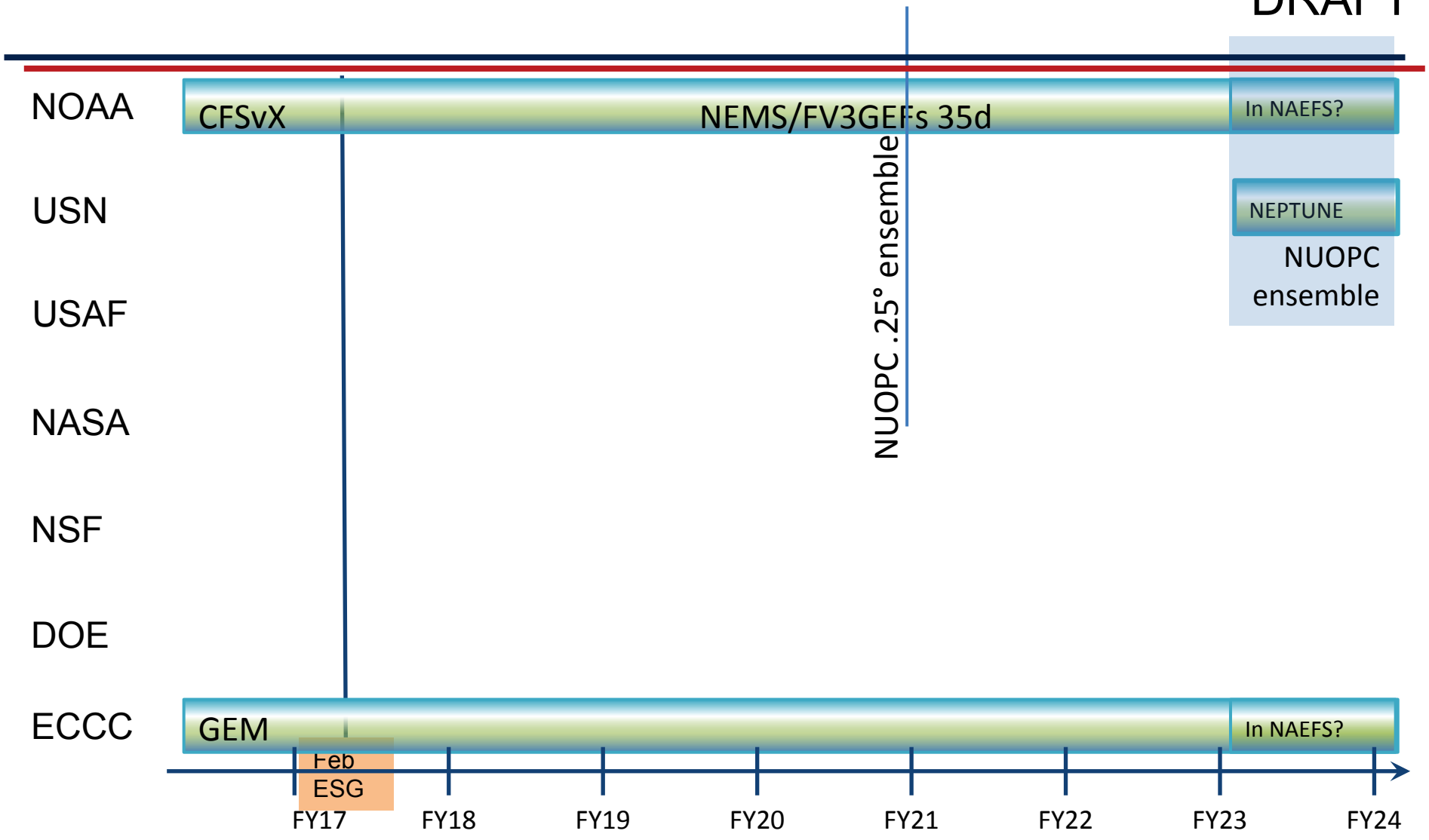

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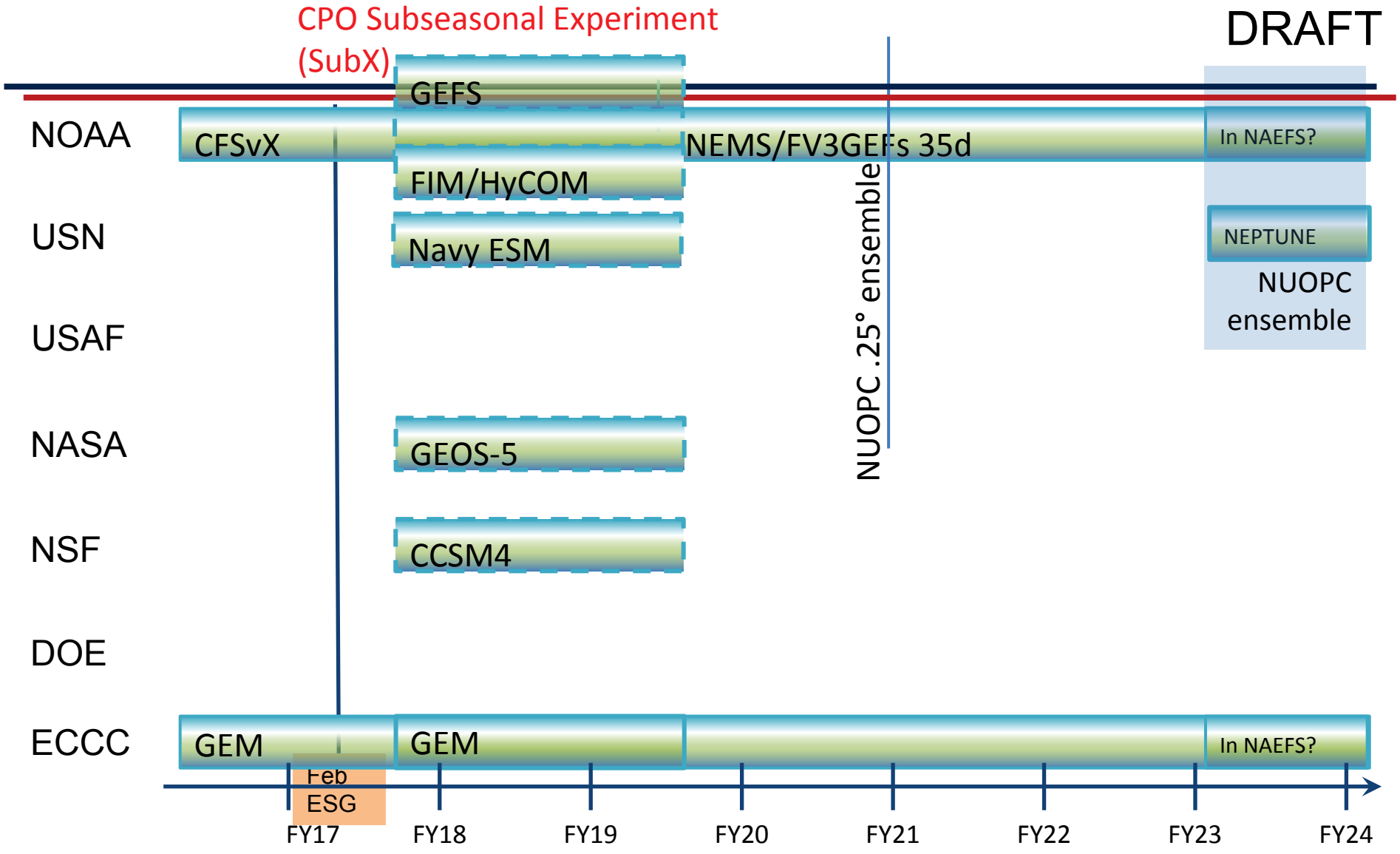

National ESPC Roadmap: Seasonal (1-12 months)

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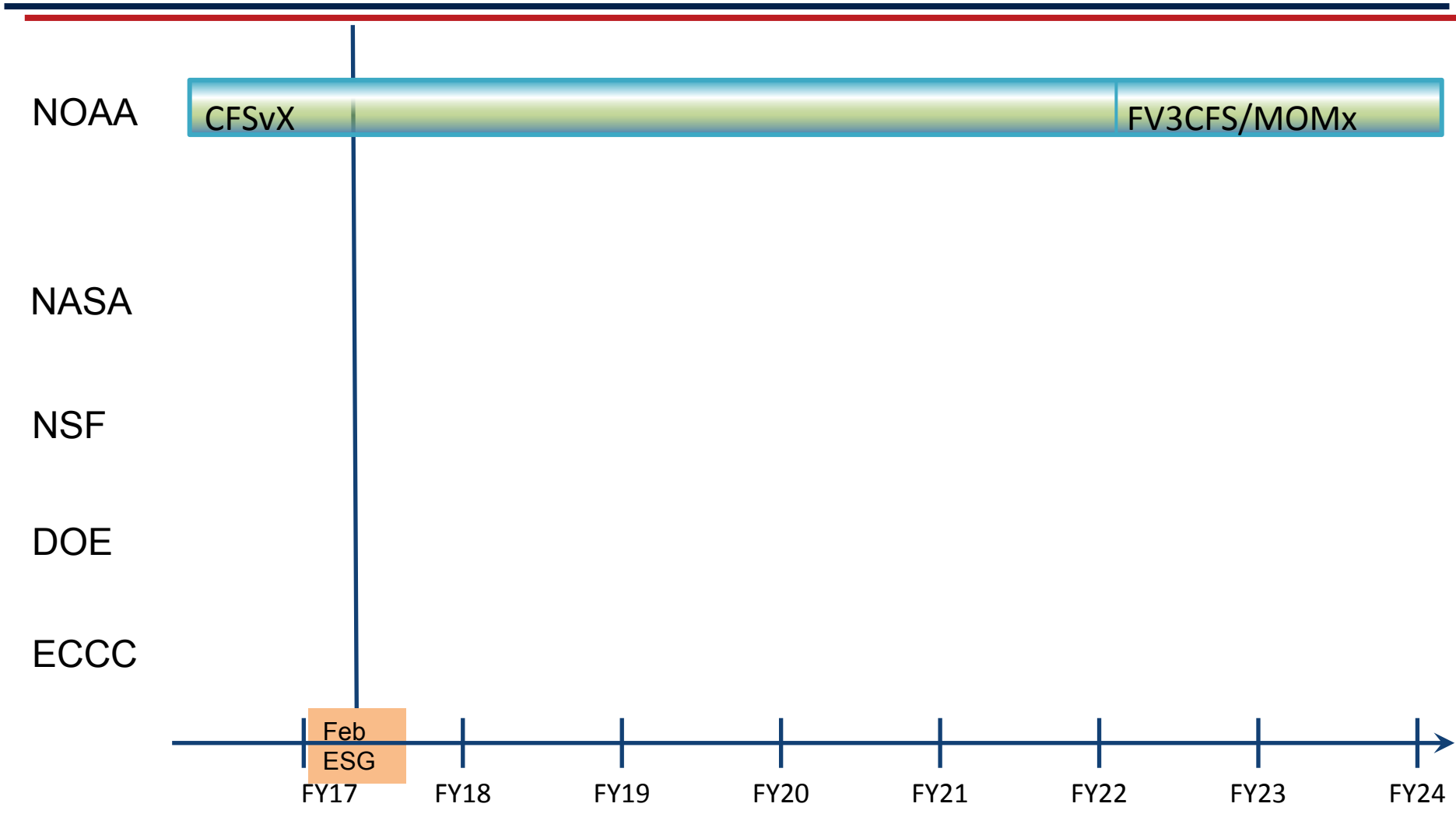

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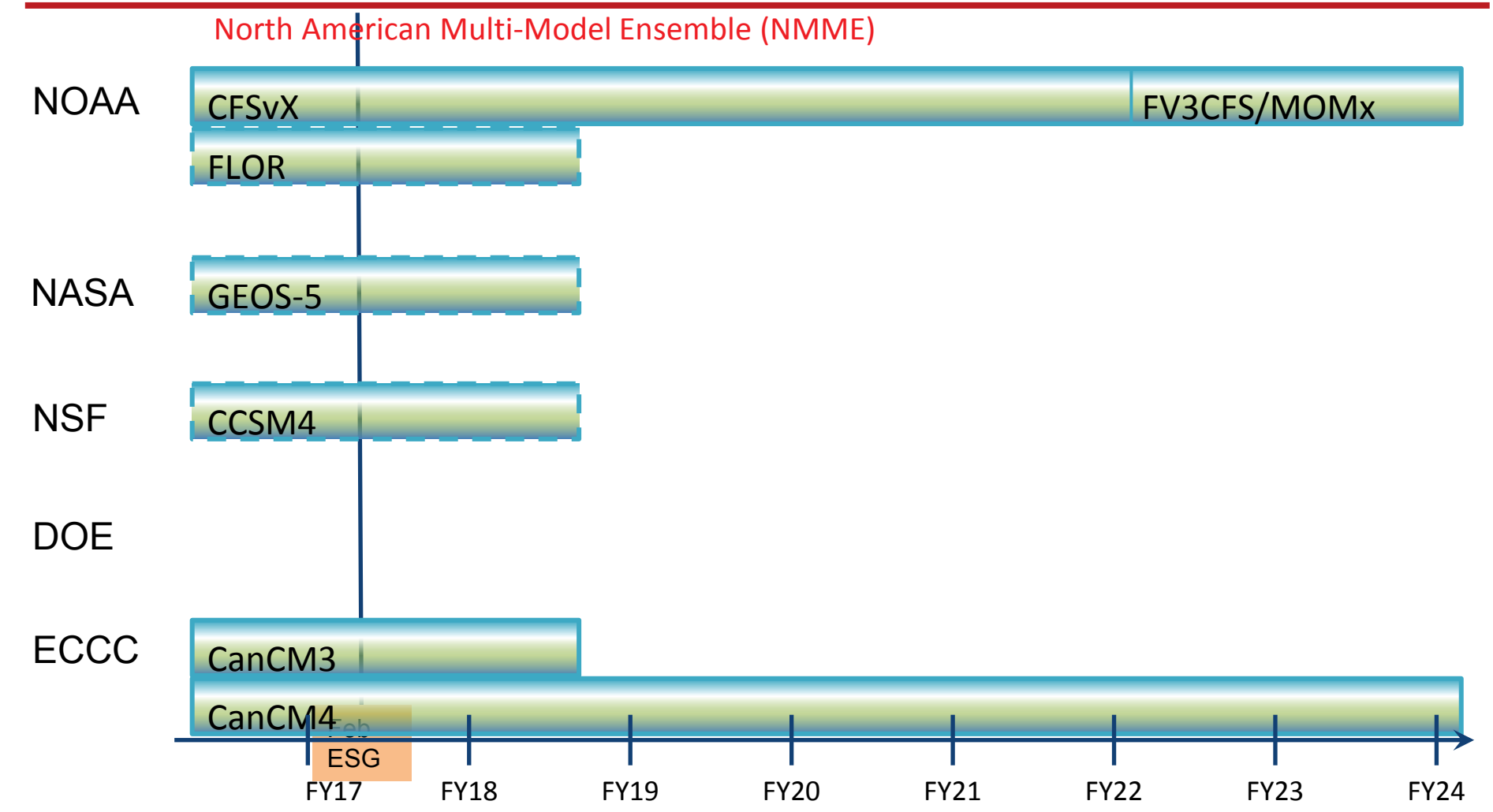

National ESPC Roadmap: Decadal (1-30 years)

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