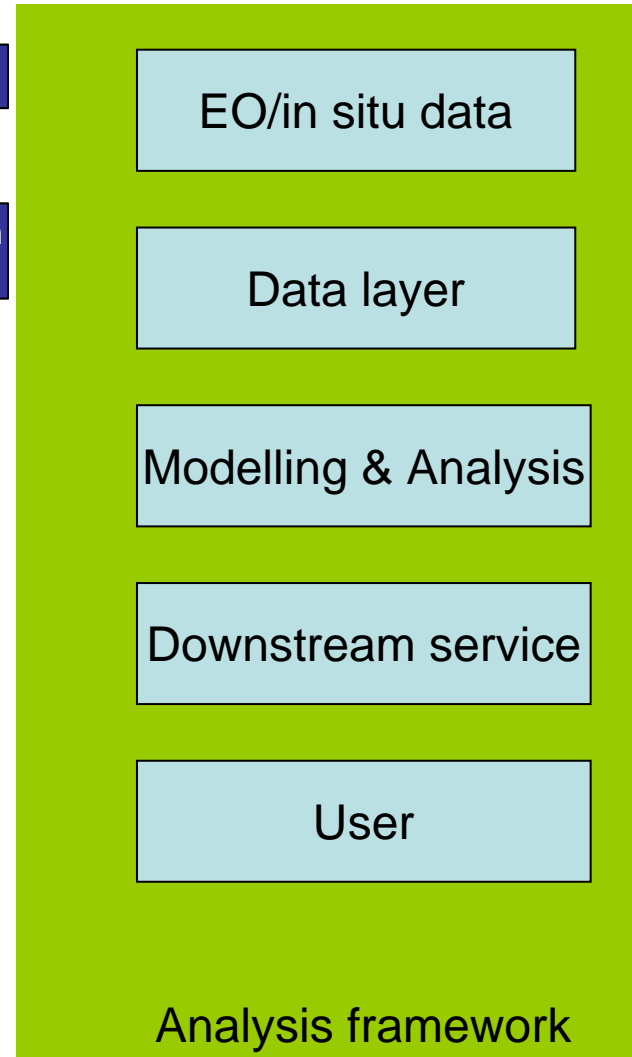
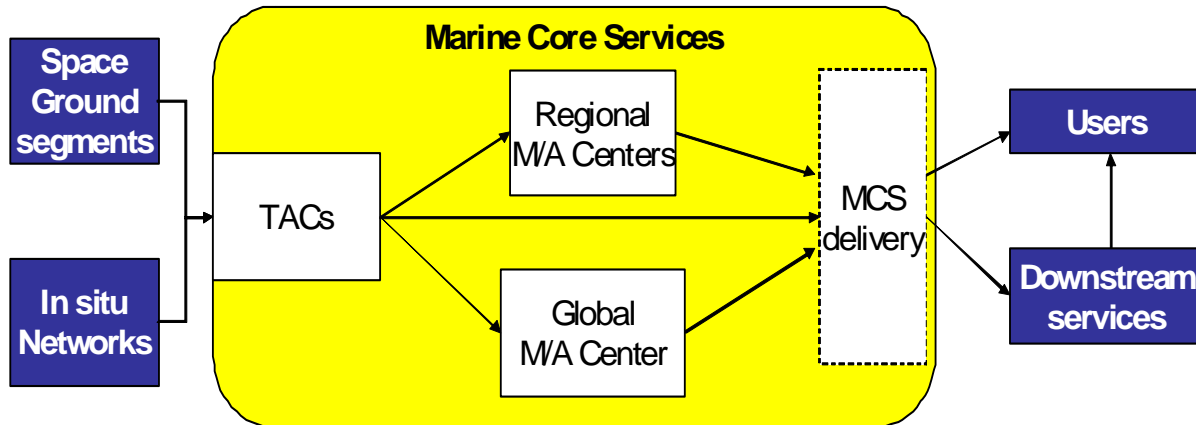


# **Summary of Marine Issues**

MARCOAST

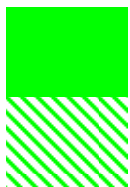
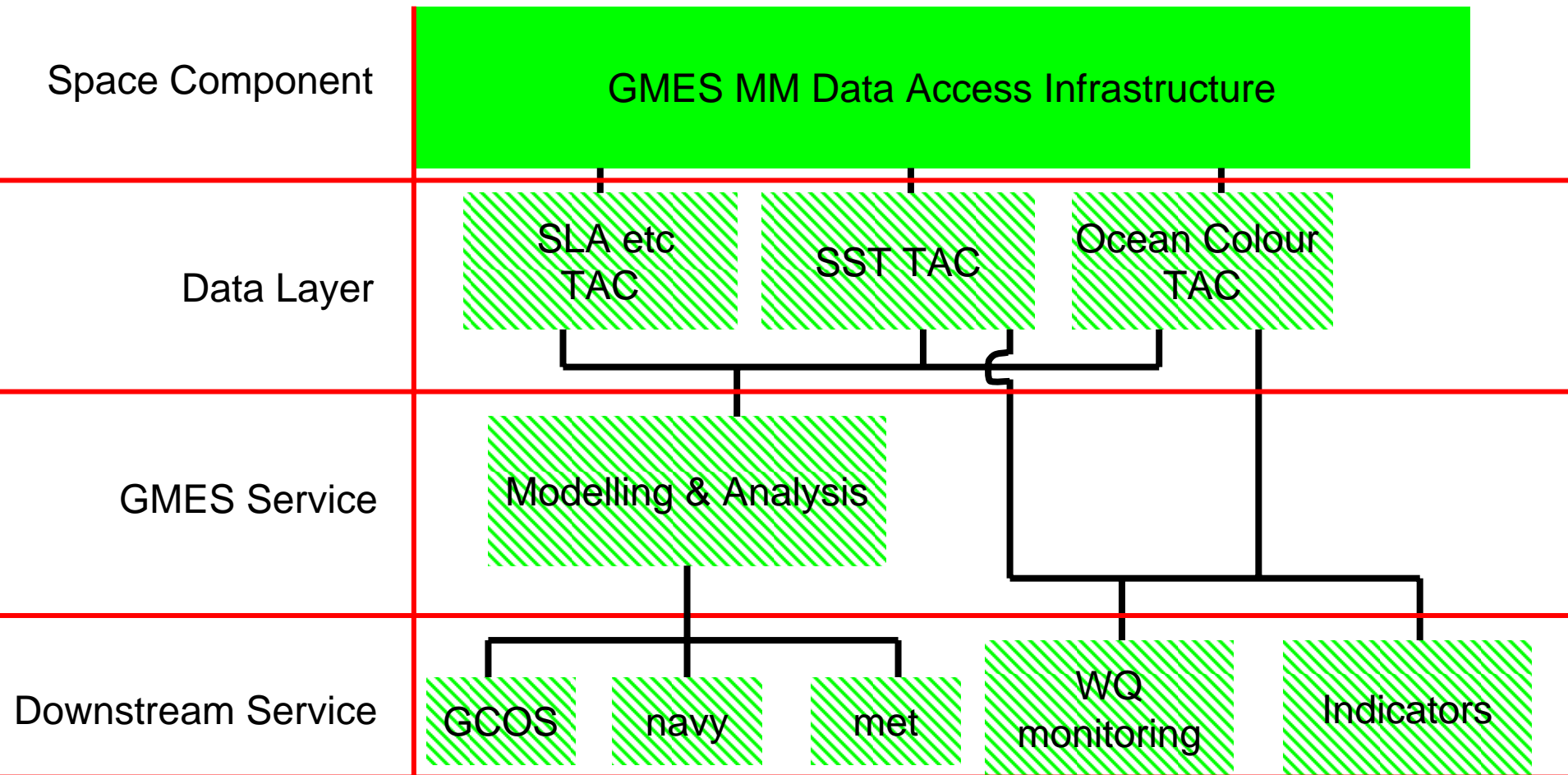
Polar View

# Marine Fast Track Architecture



Geophysical State Variable	Marine core products derived from observations	Marine core products derived from models	Products expected to be available by 2008
Sea level, sea surface height	✓	✓	✓
Temperature	✓	✓	✓
Salinity	✓	✓	✓
Currents	✓	✓	✓
Surface winds	✓	✓	✓
Surface waves	✓	✓	✓
Sea ice (extent, concentration, thickness, motion)	✓	✓	✓
<b>Biophysical State Variable</b>			
Attenuation of solar radiation – Note 4	✓		✓
<b>Bio-geochemical State Variable</b>			
Chlorophyll-a	✓	✓	✓
Dissolved inorganic nutrients	✓	✓	
Dissolved O <sup>2</sup>	✓	✓	
pCO <sup>2</sup>	✓		
Benthic biomass – Note 3	✓		
Sediment grain size & organic content	✓		
Faecal indicators - Note 1			
Oil slicks - Note 2			

# Marine Fast Track Services for GSE



100% ESA Financing

50-75% FP7 Financing

# Services Considered

- MARCOAST

- Oil pollution surveillance
- Oil spill drift forecasting
- Water Quality monitoring
- AB monitoring
- Water quality indicators
- Metocean data

- Polar View

- High resolution sea ice
- Sea ice thickness charts
- Ice forecasting
- Global sea ice
- Iceberg detection
- Floe edge mapping
- River ice mapping
- Snow cover maps
- Glacier maps

# High level summary

## FT Marine Core Service Parameters

GSE Portfolio	Geophysical State Variables								Biophysical State Variables	Bio-geochemical State Variables							
	sea level/SSH	Temperature	Salinity	Currents	Surface Winds	Surface Waves	sea ice (extent, concentration, thickness, motion)	WATER LEAVING RADIANCE (not in original list)	Attenuation of solar radiation	Chlorophyll-a	Dissolved Organic Nutrients	Dissolved O2	pCO2	Benthic biomass	Sediment grain size & organic content	Faecal indicators	oil slicks
<i>ready in 2008 &gt;&gt;</i>	■	■	■	■	■	■	■	■	■	■							
oil spill alert																	
oil spill polluter identification																	
oil spill drift forecast																	
water quality alert							■	■	■								
water quality forecast																	
AB Alert							■	■	■								
AB evolution forecast																	
WQ Indicator							■	■	■								
Hi-res ice charts																	
Sea-ice thickness charts																	
Ice forecasting																	
Global sea ice charts						■											
Ice-berg surveillance																	
Floe edge maps																	
River ice charts																	
Snow cover maps																	
Glacier maps																	

### GSE Portfolio

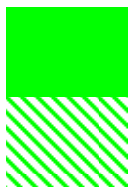
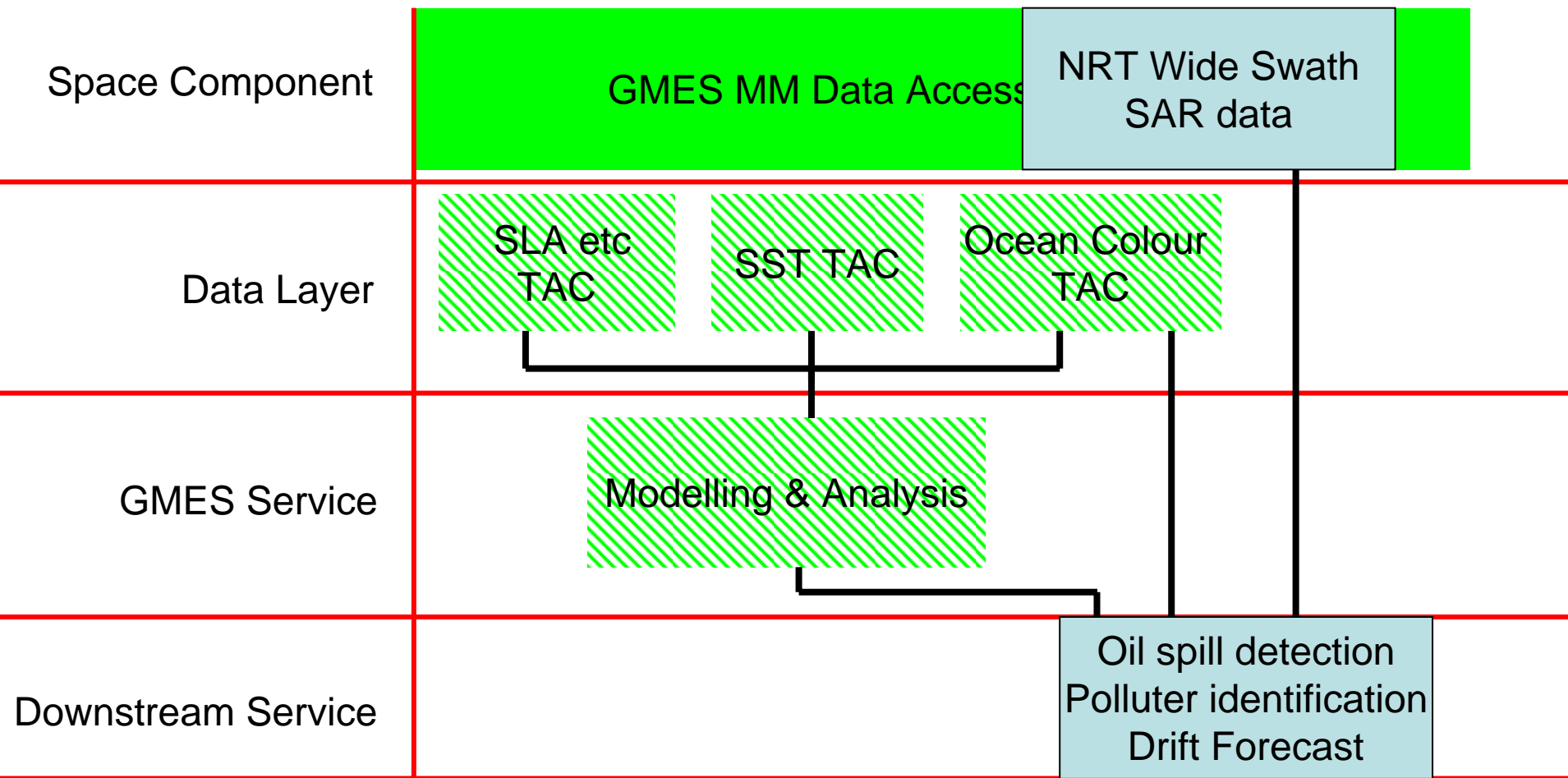
*ready in 2008 >>*

	core	downstream	not in MFT
oil spill alert			
oil spill polluter identification			
oil spill drift forecast			
water quality alert			
water quality forecast			
AB Alert			
AB evolution forecast			
WQ Indicator			
Hi-res ice charts			
Sea-ice thickness charts			
Ice forecasting			
Global sea ice charts			
Ice-berg surveillance			
Floe edge maps			
River ice charts			
Snow cover maps			
Glacier maps			

# MARCOAST Service 1 Oil pollution

- Current coverage: 17 users
  - Bonn Agreement (UK, D, B, NL)
  - Helcom (Fin, DK, Swe, Lat, Est, Pol)
  - Mediterranean (E, P, F, Gr, I)
- Service providers:
  - 5 SP (all industrial)
- Geographic expansion:
  - Black Sea
  - Southern Mediterranean
  - Red Sea
- User expansion:
  - Regional users in some cases
  - Industrial operators (OSRL, ITOFF, ...)
- Post 2008:
  - Core element:
    - NRT wide swath SAR data for GMES missions
    - SST, OC
  - Downstream element:
    - Oil spill detection and alert
    - Oil spill polluter identification
    - Oil slick evolution forecast
- Core v Downstream:
  - Core element within GMES Space Component
  - Downstream element managed by EMSA:
    - Detection & alert already operational
    - Polluter identification by mid 2008
    - Evolution forecast in Work plan

# Marine Fast Track Services for GSE



100% ESA Financing

50-75% FP7 Financing

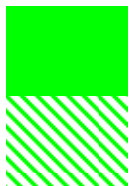
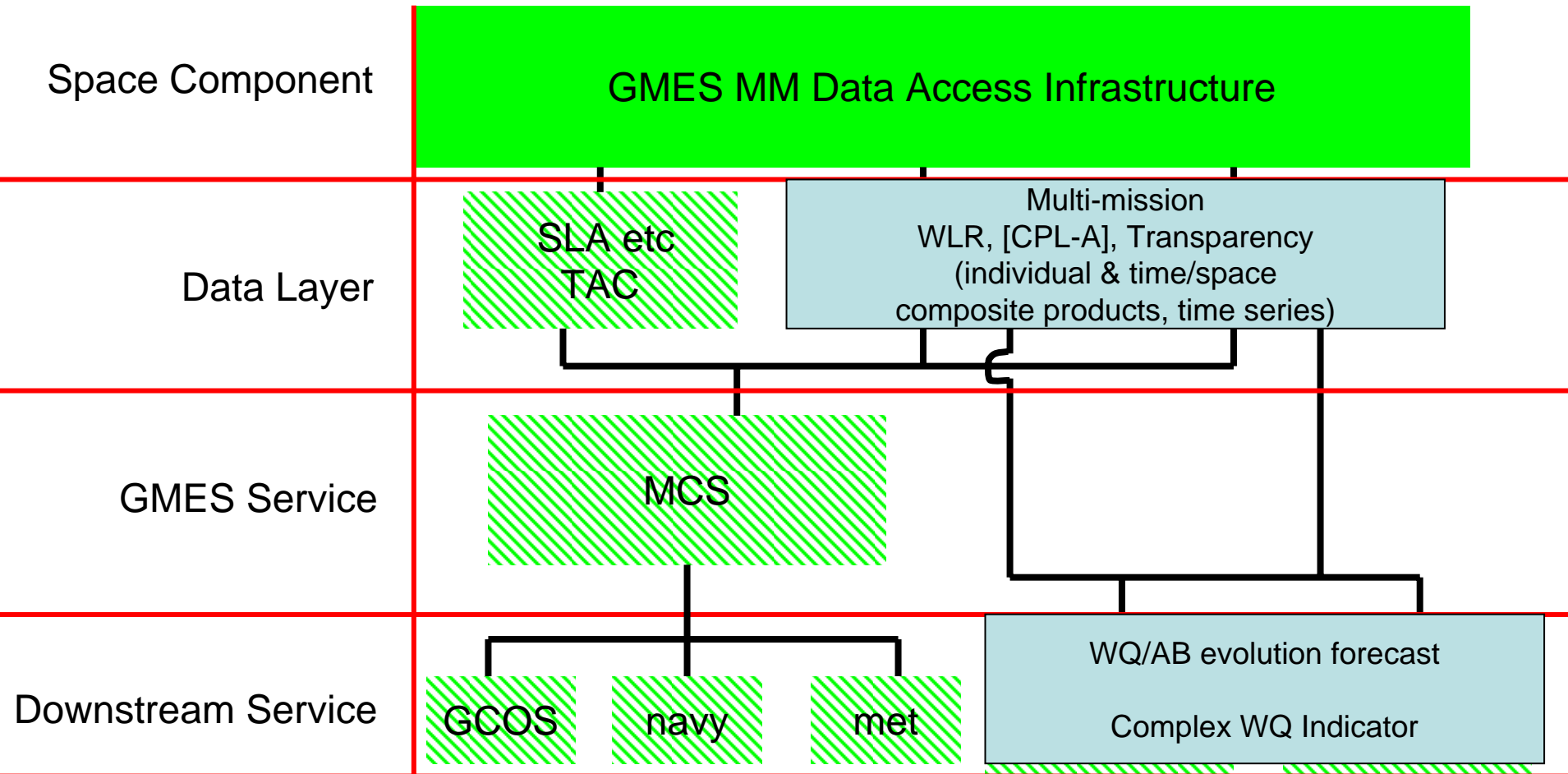
# MARCOAST Water Quality Indicators Service

- Current coverage: 2 Users
  - EEA
  - Helcom
- Service providers:
  - 3 SP (1 private, 2 public sector)
  - Already linked into ETC
- Geographic expansion:
  - no
- Service content expansion:
  - Yes but budget limited:
    - Eutrophication is 4 cpts
    - MARCOAST measures 2
    - Requirement also for trans-boundary tracking
- User expansion:
  - Other regional seas conventions (OSPAR, Barcom, Black Sea)
  - ICES
- Post 2008:
  - Core element:
    - WLR & [Chl-a] from OC TAC (re-analysis data)
    - SST from SST TAC
    - [Chl-a indicators]
  - Downstream element:
    - Eutrophication indicators
    - Primary production
    - AB frequency & duration
- Core v Downstream:
  - Core element within MCS
    - OC TAC must also provide WLR
  - Downstream element will end in 2008:
    - User will not be in a position to fund service
    - Indicators are offline (hence in theory do not require cts generation)
    - But, stopping service too early means no WQ indicators for SOER2010

# MARCOAST WQ/AB monitoring & Forecasting

- Current coverage: 32 users
  - 15 national EPAs
  - 3 regional organisations
  - 14 local/sub national organisations
- Service providers:
  - 16 SP (public/private)
- Geographic expansion:
  - Black Sea
  - Southern & Eastern Mediterranean
- Service content expansion
  - WFD reporting requirements need higher resolution input data (eg MERIS FR)
- User expansion:
  - Regional organisations (OSPAR, ICES,
  - Sub-national environment agencies (D, DK, B, F, E, I)
- Post 2008:
  - Core element:
    - NRT WLR and [Chl-a] from OC TAC
    - NRT SST from SST TAC
  - Downstream element:
    - WQ Monitoring ([Chl-a], transparency, turbidity, TSM)
    - AB delineation
    - Evolution forecast
- Core v Downstream:
  - Core element within MCS
  - Downstream element:
    - For private sector SP, some users may be able to meet subset of service delivery costs by end 2008 (I, D, NL, B, UK)
    - For public sector SP, costs are marginal addition to current expenditure on manpower
    - Main issues not addressed when funding stops:
      - Validation
      - Data exchange
    - Intermediate transition funding from Downstream Services call required

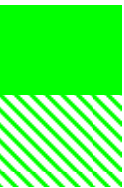
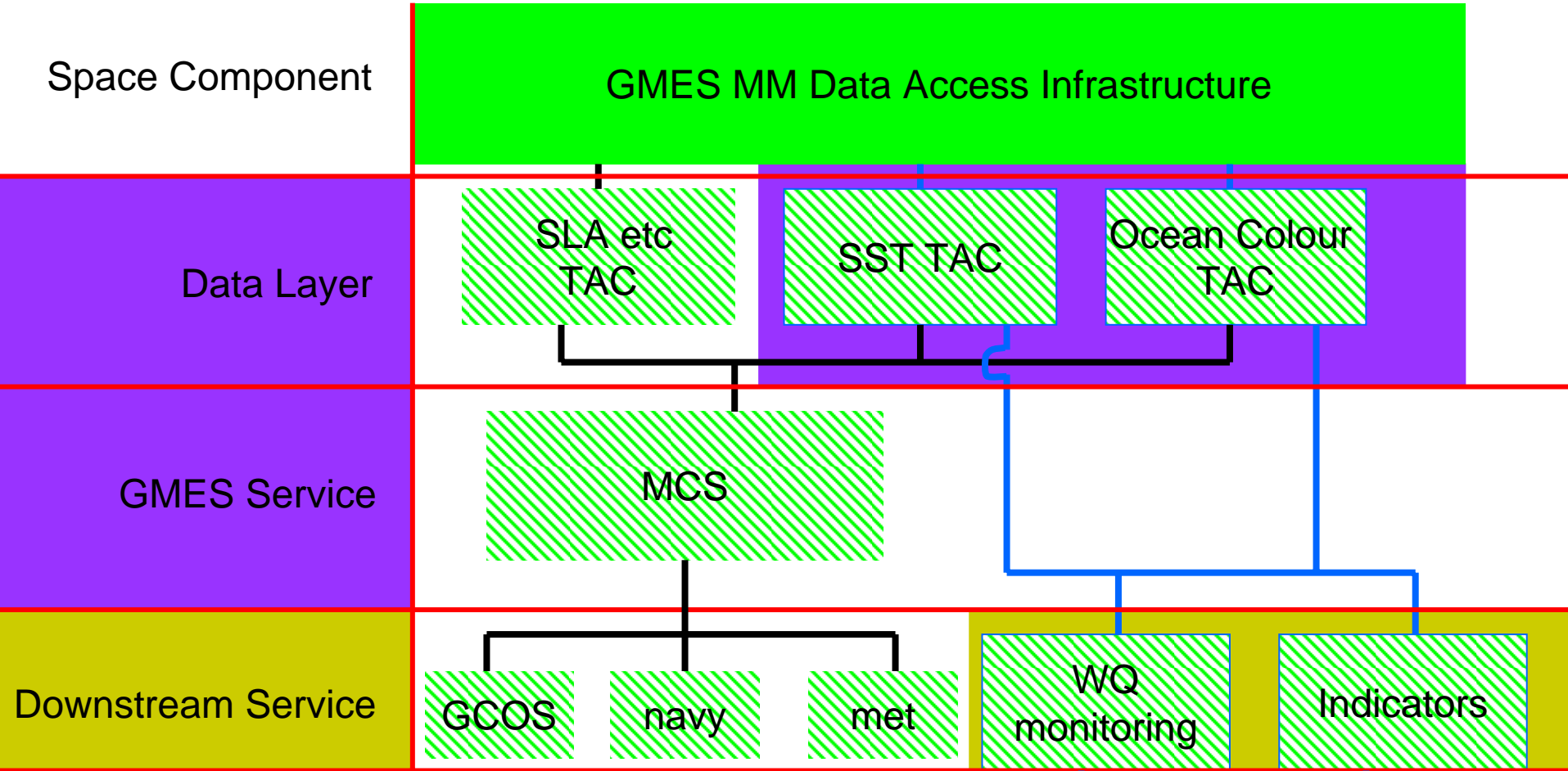
# Marine Fast Track Services



100% ESA Financing

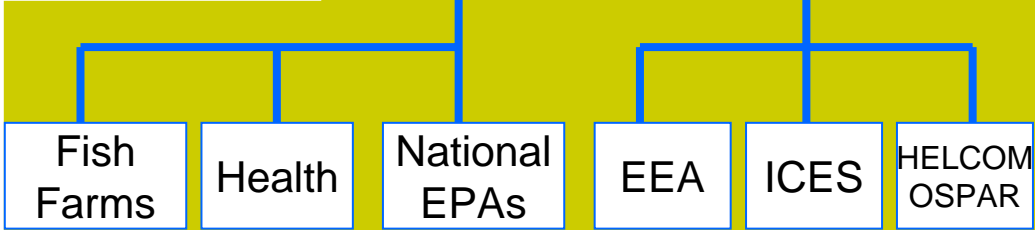
50-75% FP7 Financing

# Marine Fast Track Services



100% ESA Financing

50-75% FP7 Financing



Fish Farms

Health

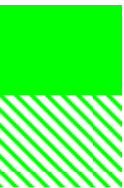
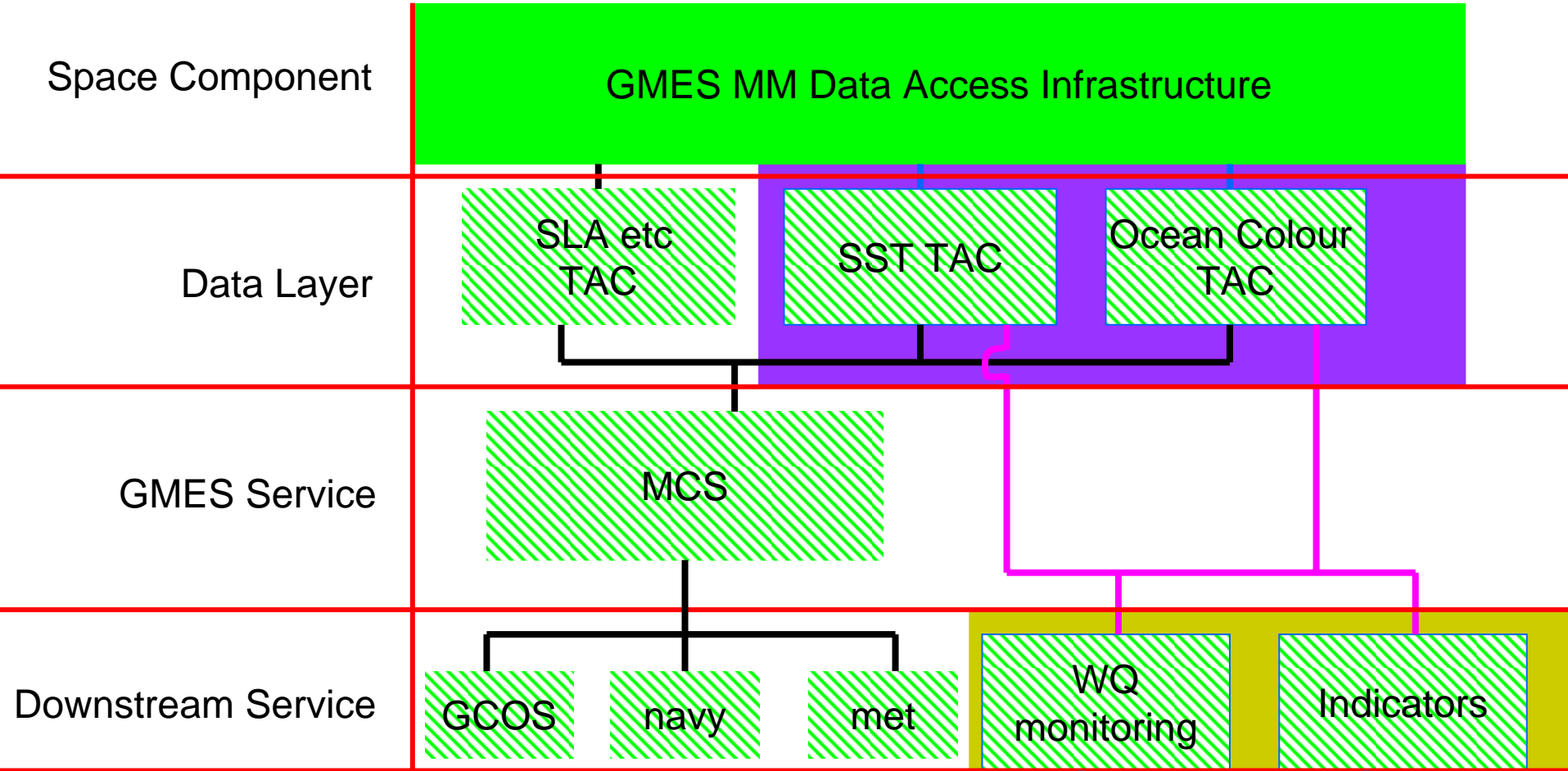
National EPAs

EEA

ICES

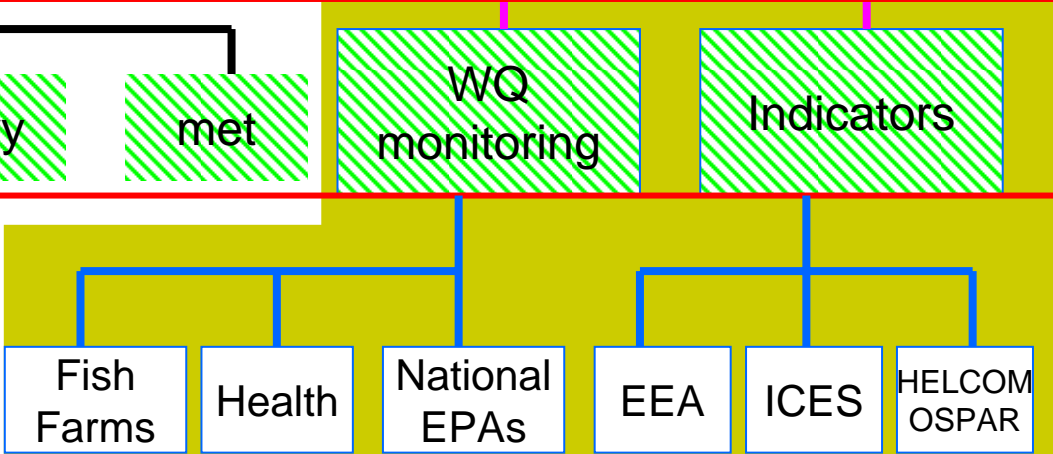
HELCOM OSPAR

# Marine Fast Track Services



100% ESA Financing

50-75% FP7 Financing



Fish Farms

Health

National EPAs

EEA

ICES

HELCOM OSPAR

# MARCOAST metocean data service

- Current coverage: MARCOAST SPs
- Service providers:
  - 5 SP (1 industrial rest public)
- Geographic expansion:
  - no
- Service expansion
  - Improved resolution and update frequency
  - Improved coverage of regional seas
- User expansion:
  - Wider range of SPs
  - Deliver direct to end users
- Post 2008:
  - Core element:
    - SST, OC, wind/wave, currents
  - Downstream element:
    - none
- Core v Downstream:
  - Core element within GMES Space Component
    - Critical to ensure current level of performance is maintained

# Summary of main points - MARCOAST

- MARCOAST products fit to either core or downstream:
  - Metocean line to MCS TACs
  - WQ/AB services use TAC output and provide downstream services
  - Oil spill migrates to EMSA management
- All WQ/QB products require that the OC TAC provides WLR as well as [Chl-a]:
  - 20-30% of total service costs are contained in the OC data processing
  - free access to OC TAC data reduces funding requirement for downstream services
- For downstream WQ/AB services users are putting in place mechanisms to bear some service costs but:
  - Unlikely to be available for many users by 2008
  - This would not address cross validation between MARCOAST partners
  - Based on FP7 call and contract timing presented by DG ENT, there is a service gap of 2 years
  - Qualification of higher resolution WQ products (eg MERIS FR) is not addressed

# Polar View High Resolution Sea ice charts

- Current coverage:
  - Svalbard, Baltic
  - Antarctic
- Service providers
  - Arctic = 4 National Ice Services, 2 industrial
  - Antarctic = 4 research institutes
- Current users:
  - Arctic – 4 national users
  - Antarctic – 10 research institutes
- Geographic expansion
  - European Arctic sector (Kara, Barents etc)
- Service content expansion:
  - Not envisaged within PV
- User expansion
  - Arctic
    - Other Baltic Maritime Administrations
    - Private sector fisheries operators
    - Private sector oil and gas operators
    - Private sector tour operators
  - Antarctic
    - research institutes
    - Private sector tour operators
    - Private sector fisheries operators
- Post 2008
  - Core Element
    - NRT Wide Swath SAR data
  - Downstream Elements
    - Ice classification
- Core v Downstream:
  - Core elements
    - Core SAR data access within GMES Space Component
  - Downstream elements
    - Up to 40 % of total service cost is NRT SAR data access
    - Remaining costs are ice analyst effort, QC, validation etc
    - For Arctic, ice classification forms input into other downstream service (forecast, thickness etc) over several MS therefore should consider Sea ice products integration within Sea Ice TAC
    - Ice classification could be maintained post Polar View by National Ice Centres but at significantly reduced volume (~50%).
    - Strong possibility of sustainable user funding (for Arctic) but transfer must be supported beyond PV
    - Antarctic Service will end if no funding available

# Polar View Iceberg Monitoring

- Current coverage:
  - North West Atlantic
  - Antarctic
- Service providers
  - 1 private sector
- Current users:
  - 1 INT (IIP)
  - 1 national ice service
  - 4 private sector
- Geographic expansion
  - Not envisaged within PV
- Service content expansion:
  - Couple with current/wind models
- User expansion
  - Not envisaged within PV
- Post 2008
  - Core Element
    - NRT SAR data
  - Downstream Elements
    - Iceberg detection and tracking
- Core v Downstream:
  - Core elements
    - Core SAR data access within GMES Space Component
  - Downstream elements
    - Up to 40 % of total service cost is NRT SAR data access
    - Remaining service costs not high but at present there is no operational budget to cover them and service provider is private sector
    - For NW Atlantic, propose to integrate iceberg data into Sea Ice TAC

# Polar View Ice forecast

- Current coverage:
  - Baltic
- Service providers
  - 2 SPs (govt agencies)
- Current users:
  - 4 govt, 2 private sector
- Geographic expansion
  - Not envisaged within PV
- Service content expansion:
  - Not envisaged within PV
- User expansion
  - Other Baltic Maritime Administrations
  - Classification Societies (private sector)
  - Shipping operators (private sector)
- Post 2008
  - Core Element
    - NRT Wide Swath SAR data
  - Downstream Elements
    - Ice rheology model
- Core v Downstream:
  - Core elements
    - Core SAR data access within GMES Space Component
  - Downstream elements
    - Downstream service costs ultimately to be supported by national governments
    - Some contribution already from FIMR
    - Strong requirement to maintain contribution to total service costs under FP7

# Polar View Global Sea ice

- Current coverage:
  - Arctic
  - Antarctic
- Service providers
  - 3 SPs (2 Public, 1 Research Institute)
- Current users:
  - 2 government users
  - 1 research centre
  - 1 private sector
- Geographic expansion
  - Not possible
- Service content expansion:
  - Not envisaged within PV
- User expansion
  - Operational Oceanography providers
  - Climate Research Centres
- Post 2008
  - Core Element
    - Global medium/low resolution sea ice cover
    - Global medium/low resolution Ice drift
  - Downstream Elements
    - none
- Core v Downstream:
  - Core elements
    - Output products represent important BC for operational oceanographic modelling
    - Requirement for Sea Ice TAC to continue generating these products once PV is ended
  - Downstream elements
    - Not applicable

# Polar View River/Lake Ice & Floe Edge

- Current coverage:
  - Canada
  - Siberia
- Service providers
  - 3 SPs (all CDN, all private sector)
- Current users:
  - 4 govt departments (3 CDN, 1 USA)
  - 7 regional govts (5 CDN, 2 RUS)
  - 1 private sector (CDN)
  - Numerous general public (CDN)
- Geographic expansion
  - Small additional potential (Fin, Swe, Greenland)
- Service content expansion:
  - Not envisaged within PV
- User expansion
  - Not envisaged within PV
- Post 2008
  - Core Element
    - Access to SAR data
  - Downstream Elements
    - Ice classification and edge delineation
- Core v Downstream:
  - Core elements
    - SAR access is within GMES Space Component
  - Downstream elements
    - Current users all outside EU territory
    - Service providers all private sector and all CDN
    - Service continuity dependent on continuity of CDN activities within GMES
    - MCS cooperation should include consideration of GMES as EU contribution to GEOSS

# Services not transferable (polar view)

- **Glacier Monitoring**
  - **Service Providers**
    - 1 university, 2 private sector
  - **Users**
    - NWED, NRCAN, iceland, Swe
  - **Data Sets**
    - InSAR, SAR, optical
  - **Sustainability**
    - Sweden already sustainable as routine glacier monitoring part of Natura 2000 implementation of Habitats directive
    - For other countries, service complexity (motion assessment, facies mapping, modelling) complex and costly and service will stop if no alternative funds available
- **Snow Cover Mapping**
  - **Service providers:**
    - 2 public (Fin), 2 private sector
  - **Users**
    - 9 govt departments (N, Fin, D, Swe, Est), 1 private sector
  - **Data sets**
    - AVHRR/MERIS/MODIS
    - Passive MR
    - ScanSAR for wet snow cover
  - **Sustainability:**
    - Data acquisition and automatic product generation represents major cost driver
    - If no finance post July 2008, 1 public sector service provider can continue at lower service volume, others would stop (assumes GMES EO data paid)

# Summary of main points – Polar View

- Polar view products within MFTS core or downstream:
  - Global sea ice as MCS TAC
  - High resolution sea ice, iceberg monitoring, ice thickness as downstream
- Polar View products not related to Marine FTS
  - Glacier and Snow Monitoring
  - River/Lake Ice & Floe Edge location
- PV core and downstream products assume access to SAR data under GMES Space Component
- For downstream services:
  - Sea ice, iceberg service costs include 40% of total cost for SAR data procurement
  - Possibility of national ice services taking over PV sea ice services but at significant reduction in service volume. Full transition to national funding would require continued (partial) funding of services
  - Some services (river/lake ice, floe edge) are outside EU territory and should therefore be considered in the framework of GMES international cooperation

# Proposals for Integration with MCS

- Issue:
  - Downstream services call not until 2009
  - Requirement for current call to include certain amount of end-to-end service demonstrators
- Proposal:
  - Identification of potential end-to-end demonstrators demonstrating impact and benefits of MCS
  - Consider both indicators/re-analysis and monitoring/forecasting
- Demonstrators to be included
  - European extended indicators service:
    - Eutrophication and SST indicator generation
    - Bring in EEA, Helcom and other secretariats as MCS users
  - Baltic Monitoring:
    - Link MCS Baltic Module with MARCOAST WQ/oil spill drift services and Polar View Sea Ice Forecasting services (Sea ice includes Svalbard)
    - Same national users for WQ and sea ice products (eg BSH, FIMR)
    - Brings in EMSA and HELCOM as well as national agencies as MCS users
    - Strong interest, in particular wrt oil spill in sea ice
  - Integrated oil/ice forecasting
    - Link MCS forecast products with oil spill and iceberg detection service for improved evolution forecasting
    - Brings in IIP and EMSA as MCS user