

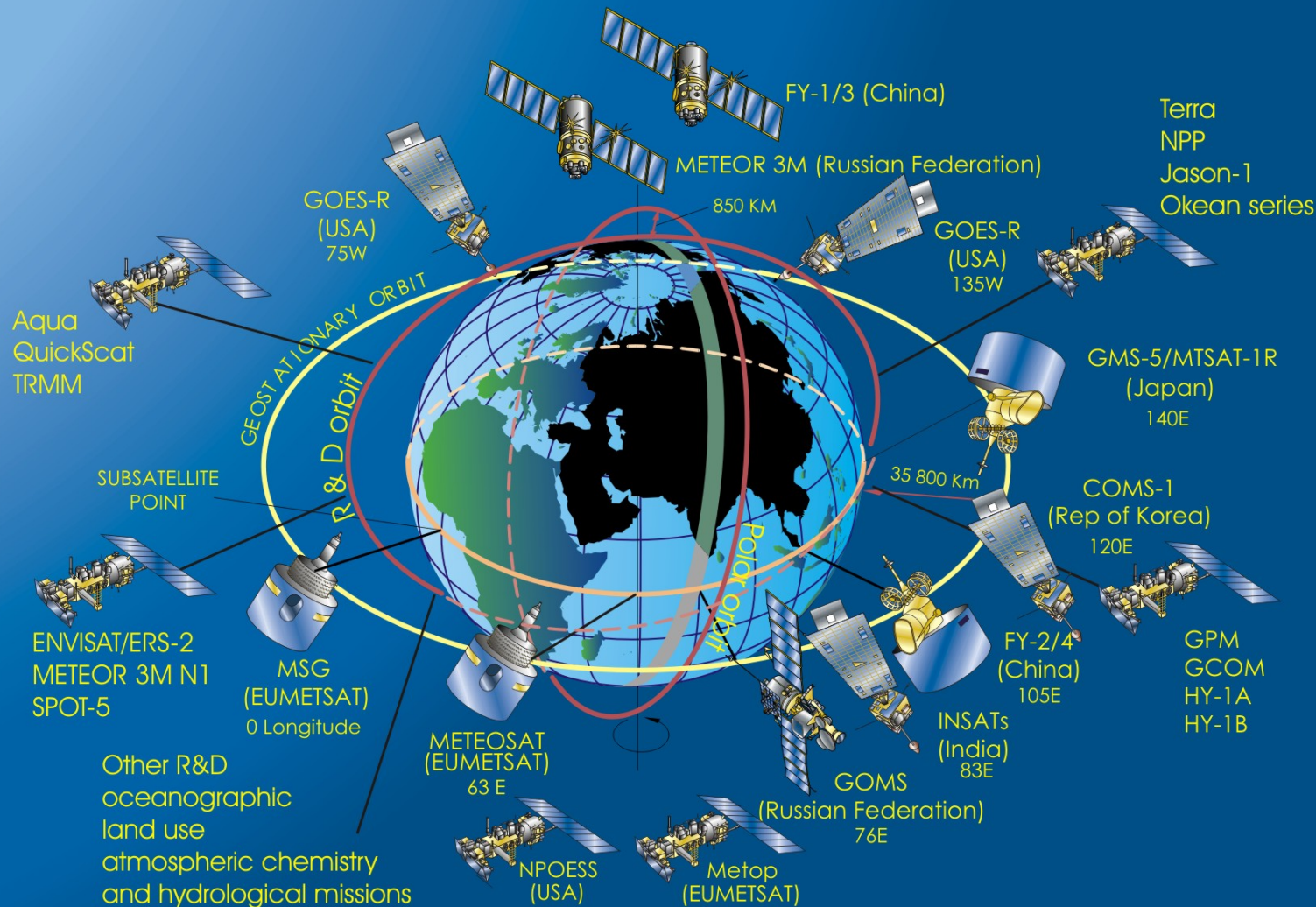
**The WMO Space Programme
Serving
WMO's Global Observing System**

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Outline

- Status of the WWW's space-based sub-system GOS
- Integrated Global Data Dissemination Service (IGDDS)
- Global Space-based Inter-calibration System (GSICS)
- Rolling Review of Requirements Process
 - Wind Profiling

WWW's space-based component of the Global Observing System (2006)



Unparalleled international cooperation has been achieved in satellite activities

Status of the WWW's space-based component

GOS

Standing members

- operational satellite operators

Newest members

- NASA – Aqua, Terra, NPP, TRMM, QuickScat
- JAXA – GCOM series
- ESA – ERS 1 and 2, ENVISAT
- FSA –METEOR 3M N1 (R&D inst), OKEAN series
- CNES – Jason-1, SPOT-5
- IMD – INSAT series
- Republic of Korea – COMS-1
- CNSA – HY-1A, HY-1B

Possible future members

IGDDS

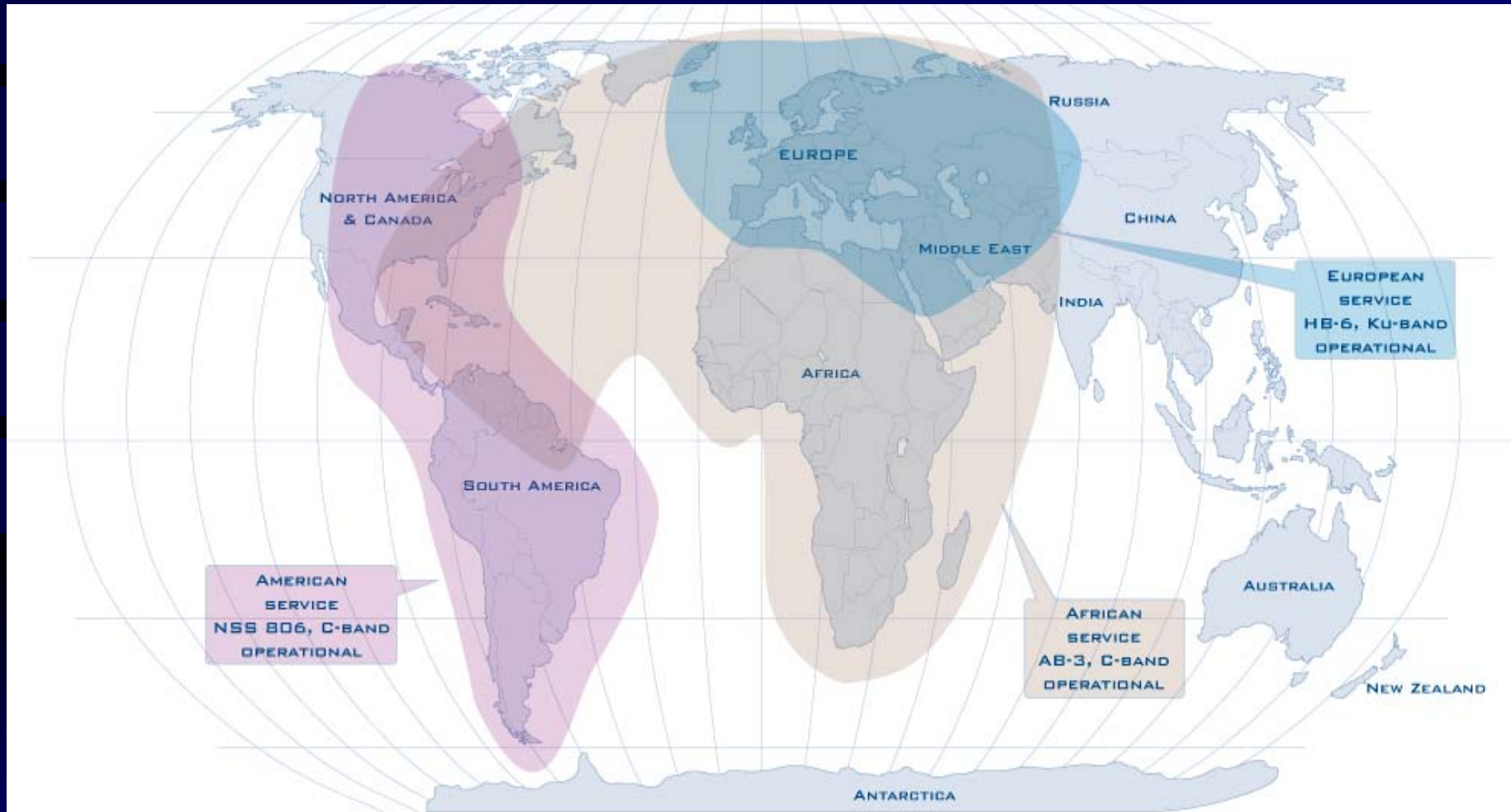
Integrated Global Data Dissemination Service

- A WMO-CGMS initiative to enhance satellite data access and use
- Thematic component of the WIS for space-based data & products
- IGDDS project addresses specific issues raised by satellite data:
 - Rapidly evolving requirements
 - Data concentration (incl. GEO, LEO, RARS, R&D, products)
 - Data distribution (ADM, Direct Broadcast, Internet push/pull, GTS)
 - Service management (interoperable catalogue, metadata, access control, quality of service monitoring) and interactive services, user support
- Expanding current assets :
 - Rolling Requirements Review for observation data
 - EUMETCast as a model of ADM dissemination
 - EARS as a model for RARS
 - Point-to-point GTS as backbone to send products to NWP centres

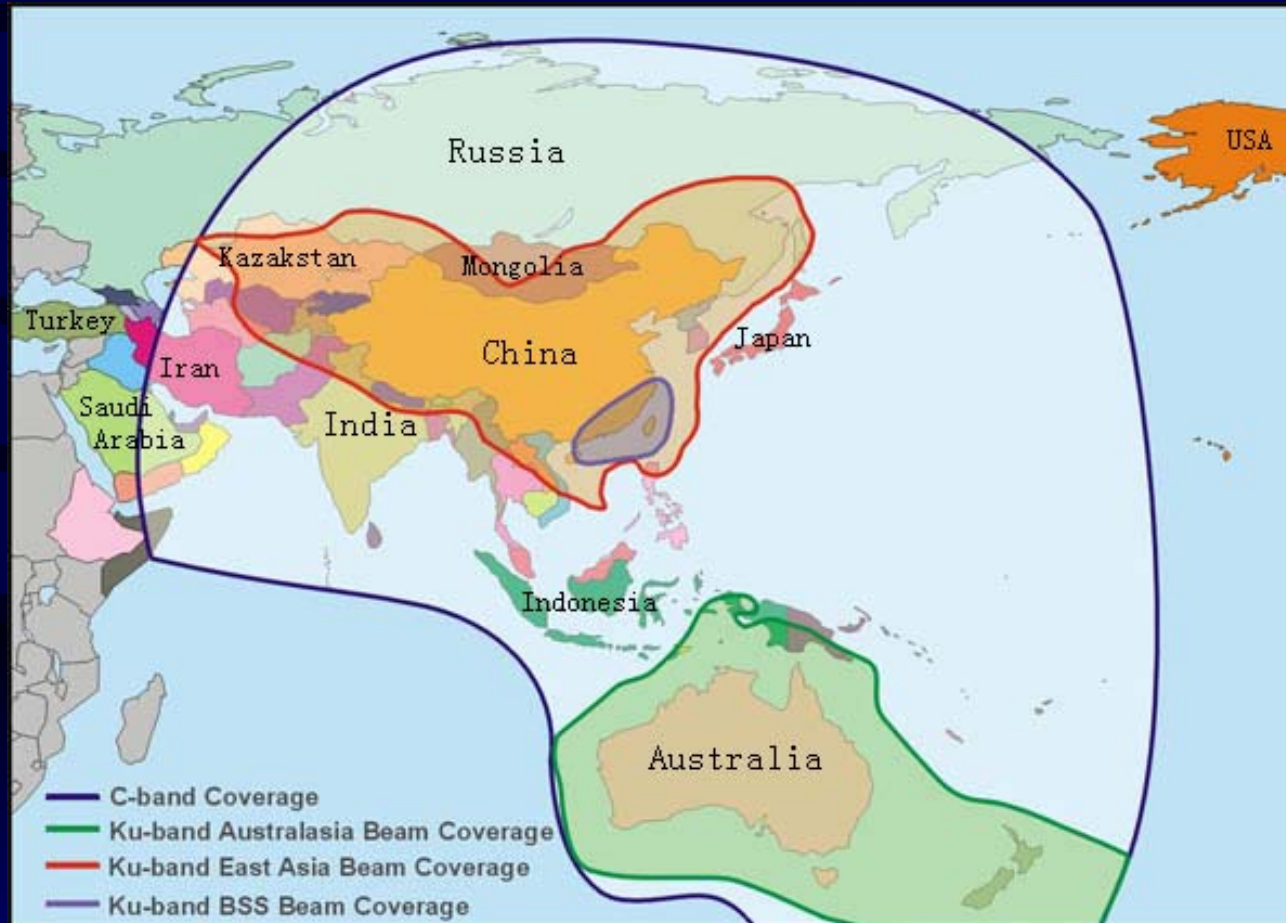
ADMs by satellite operators

- **Europe : EUMETCast-Ku band (*EUMETSAT*)**
- **Africa and Caribbean: EUMETCast-C band (*EUMETSAT*)**
- **Central & South-America :**
 - **pilot EUMETCast-C band (*EUMETSAT*) for 3 years**
 - **considerations for a transition to a NOAA ADM service by 2008 covering North-, Central, South-America and Pacific islands**
- **Asia-Pacific regions :**
 - **current Shinetek ADM over China**
 - **trial planned in 2006 for wide Asia-Pacific ADM including DVB-S broadcast and terrestrial links**

EUMETCast Overall Coverage



Ku Band to C band (AsiaSat-4 at 122E)



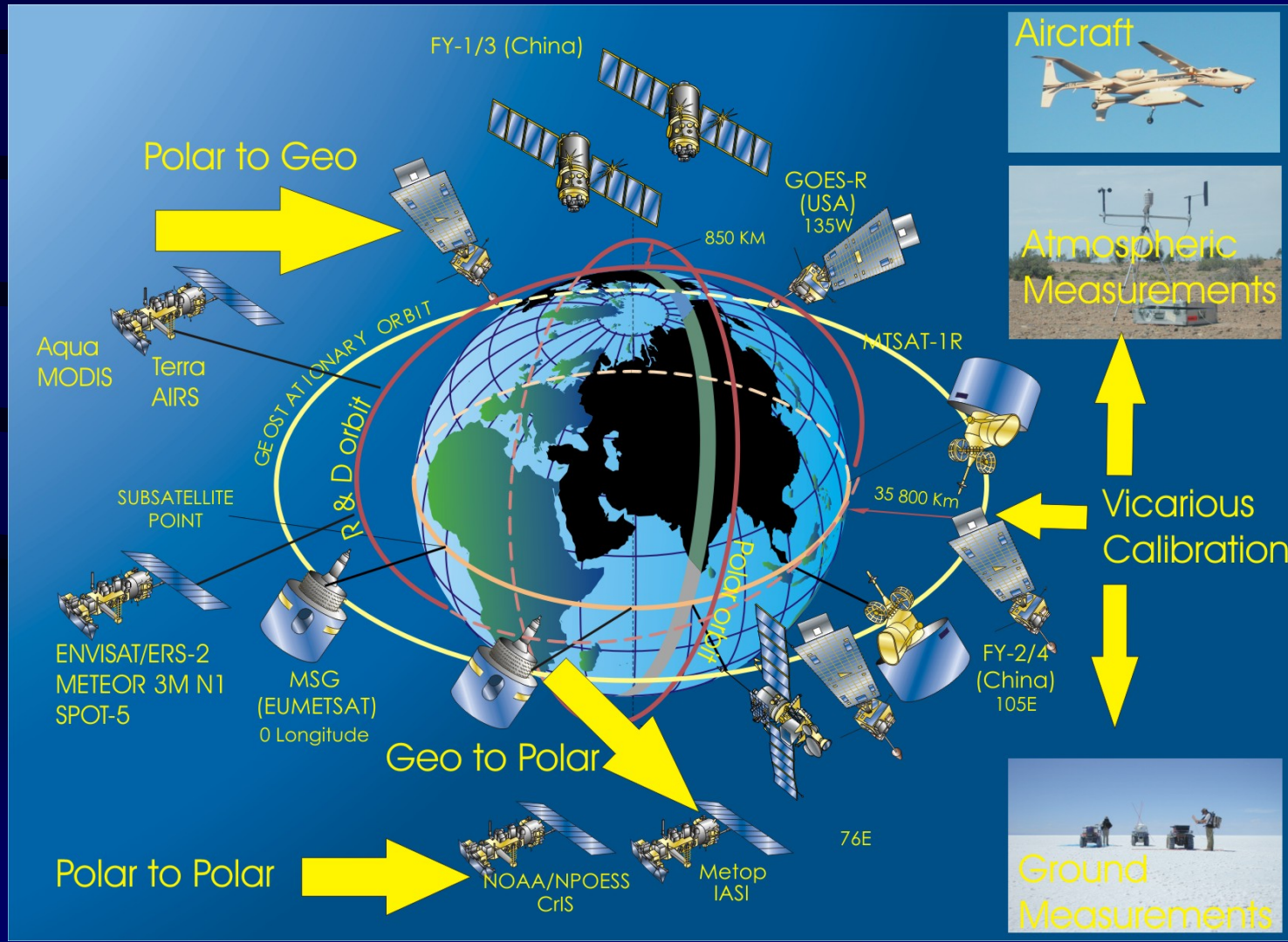
Global Space-based Inter-calibration System

- A WMO requirement responding to:
 - WMO Space Programme Implementation Plan
 - GCOS Climate Monitoring Principles
 - EUMETSAT SAF on Climate Monitoring
 - WMO's Commission for Basic Systems (St. Petersburg, Feb. 2005)

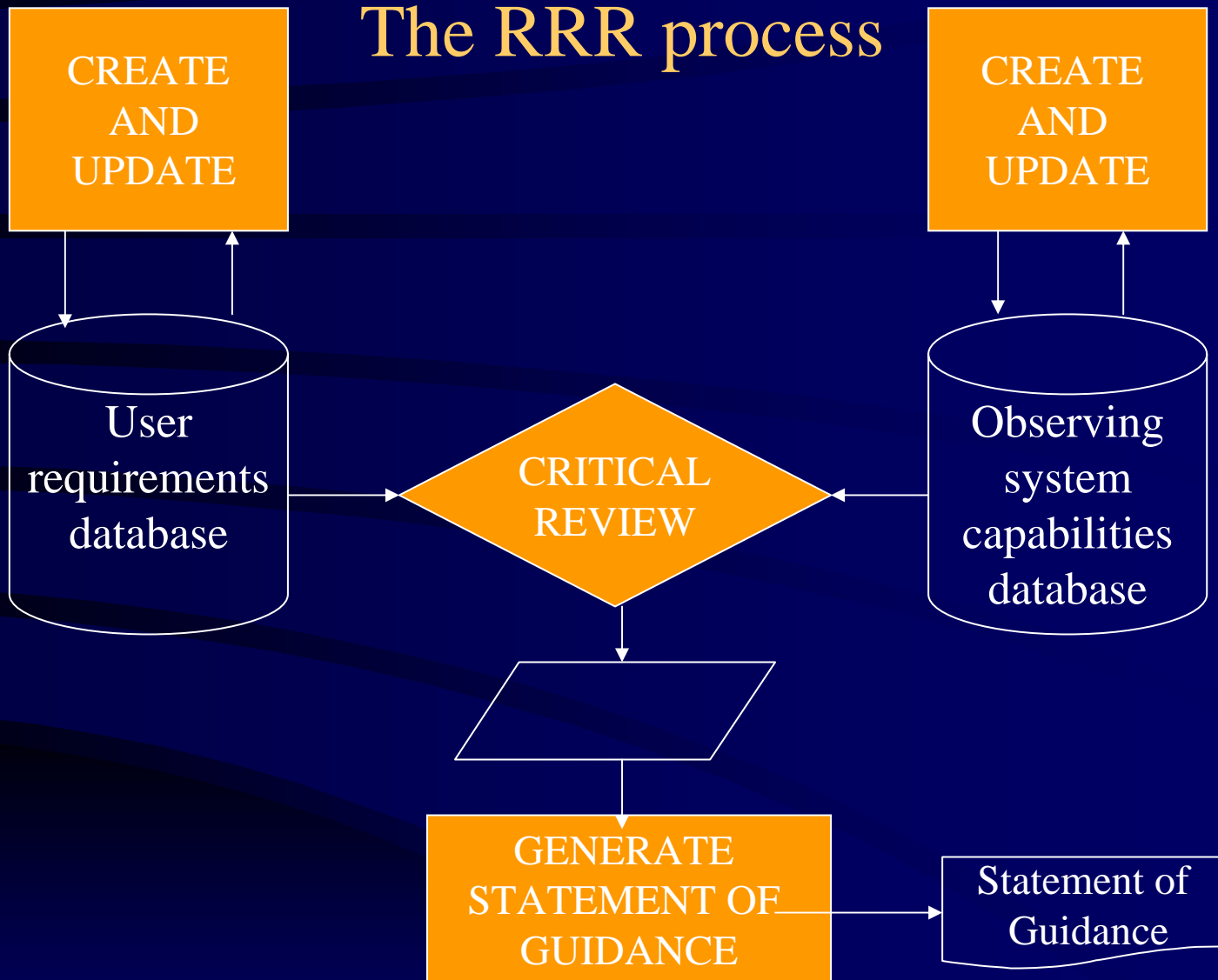
Global Space-based Inter-calibration System

- Relevant to many (most) societal benefit areas in the Global Earth Observing System of Systems (GEOSS)
- WWW/GOS will contribute to the space-based component of the GEOSS
- Imperative to have a space-based inter-calibration system as subsystem of the space component of the WWW/GOS and the GEOSS
- Achievable especially with new instruments and missions

Global Space-based Inter-Calibration System (GSICS)



The RRR process



Features of RRR

- Generate and maintain databases of user requirements (URs) and observing system capabilities (OSCs)
- URs should be:
 - “technology-free” - should not pre-judge the technology to meet them
 - specified separately for each “application area”, e.g. global NWP, regional NWP, nowcasting, seasonal/inter-annual forecasting, ...
- Critical Review (CR) - objective comparison of URs and OSCs
- Statement of Guidance - **interprets** output of CR - highlights key points and priorities - requires judgement

How user requirements are specified

- for each application, in terms of geophysical variables (level 2 products)
- for each variable, in terms of the following parameters:
 - horiz. and vert. resolution, observing cycle, accuracy and timeliness
- for each parameter, in terms of the “max” and “min” requirements, recognising that observations increase in usefulness over a range from “min” to “max”
 - “min” = value beyond which observations have no significant value
 - “max” = value beyond which observations give no additional value

Critical Review Chart

Wind Profile 500 - 100 hPa

Wind profile 500-100 hPa (HT)

Analysis for GCPS IP Atmos

1. Requirement Summary and assessment key

Colour key	Hor km	Vert km	Cycle d	Delay h	Acc m/s
Exceeds Goal	0.0	0.0	0.0	0.0	0.0
	100.0	0.5	3.0	3.0	2.0
Breakthrough	171.0	0.6	3.8	7.6	2.7
Threshold	500.0	1.0	6.0	12.0	5.0

Note:

This chart is a comparison between a requirement and expected observing system performances. It is a component of the Critical Review and Statement of Guidance used by the CBS OPAG IOS Expert Team on Data Requirements and Redesign of the GOS.

Cycle colour assessment based on a constellation of 2 polar-orbiting satellites (1 geostationary)

2. Instruments for: ind profile 500-100 hPa (HT)

Showing relevant instruments for which details are available

Instrument	Hor		Vert		Cycle		Delay		Acc		Mission		O/bit
	km		km		d		h		m/s		name	rating	
RADAR RA-IV C	3.0		1.0		0.1		0.5		2.00		WWW_in situ		G3
RADAR RA-VI WE	3.0		1.0		0.1		0.5		2.00		WWW_in situ		G3
Amdar FL RA-IV C	90.0		5.0		1.0		1.0		2.00		WWW_in situ		G3
WND P 449 RA-IV C	700.0		0.3		1.0		0.5		1.50		WWW_in situ		G3
WND P 915 RA-IV C	1000.0		0.1		1.0		0.5		2.00		WWW_in situ		G3
GIFTS	40.0		2.0		1.0		1.0		3.00		Nmp-3		G4
Raobs RA-VI WE	218.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs RA-II E	294.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs RA-IV C	331.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
SEVIRI	100.0		5.0		1.0		1.0		4.00		Msg-1,,3		G3
Raobs RA-VI EE	369.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs RA-II S	442.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs RA-II N	444.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs RA-IV N	447.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
VISSR (FY-2)	50.0		5.0		1.0		2.0		5.00		Fy-2a		G4
VISSR (FY-2)	50.0		5.0		1.0		2.0		5.00		Fy-2b		G5
Imager	150.0		5.0		1.0		1.0		5.00		Goes-8,9		G3
Imager	150.0		5.0		1.0		1.0		5.00		Goes-K,,P		G1
Imager	150.0		5.0		1.0		1.0		5.00		Goes-M,,O		G2
IMAGER/MTSAT-2	150.0		5.0		1.0		1.0		5.00		Mtsat-1,2		G5
MVIRI	150.0		5.0		1.0		2.0		5.00		Meteosat-3,,7		G3
MVIRI	150.0		5.0		1.0		2.0		5.00		Meteosat-5		G4
Sounder	150.0		5.0		1.0		1.0		5.00		Goes-8,9		G3
Sounder	150.0		5.0		1.0		1.0		5.00		Goes-K,,P		G1
Sounder	150.0		5.0		1.0		1.0		5.00		Goes-M,,O		G2
VISSR (GMS-5)	150.0		5.0		1.0		2.0		5.00		Gms-5		G5
Amdar FL NAO CST	50.0		5.0		24.0		1.0		2.00		WWW_in situ		G3
Amdar FL RA-VI WE	38.0		5.0		8.0		1.0		2.00		WWW_in situ		G3
Raobs ARC	793.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs MED	703.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs NAO CST	1455.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs NAO OPN	1839.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs NIO OPN	1533.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs NPO OPN	2008.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs RA-I N	1406.0		0.3		12.0		1.5		2.00		WWW_in situ		G3
Raobs RA-I S	652.0		0.3		12.0		1.5		2.00		WWW_in situ		G3

Implementation Plan for the space-based component of the GOS

- CBS Implementation Plan for the Evolution of the GOS
- Twenty items assigned to the WMO Space Programme
 - Wind profiling:

S10. LEO Doppler Winds - Wind profiles from Doppler lidar technology demonstration programme (such as Atmospheric Dynamics Mission - Aeolus) should be made available for initial operational testing; a follow-on long-standing technological programme is solicited to achieve improved coverage characteristics for operational implementation.