



Title: C3S - Baseline And Reference Observations Network (C3S-BARON)

ITT title: Collection and Processing of
In Situ Observations - Lot 3

ITT Ref: C3S_311a_Lot3

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ITT Ref: C3S_311a



“Access to observations from baseline and reference networks”

Objective: to rationalise, harmonise and generally improve access to measurements provided by the large variety of existing networks, to facilitate climate monitoring, estimation of ECVs and uncertainty assessments.

Scope of service

Tenders for this Lot shall:

- ☐ Prioritise access to observations of ECVs that are not well observed from space;
- ☐ Prioritise access to data that can be used and redistributed without restriction;
- ☐ Address multiple ECVs within at least one of the physical climate domains: **atmosphere**, land surface, ocean.



C3S-BARON: objectives



- To rationalise, harmonise and improve access to open and free observational records and data streams from selected in-situ GCOS-relevant Baseline and Reference observing networks
 - facilitating climate monitoring,
 - estimation of ECVs and uncertainty assessments (surface temperature, atmospheric temperature and humidity vertical profiles), ozone (column and profiling concentration), wind profiles (from radiosoundings), CO, CO₂ and CH₄ (column concentrations), and water vapour content (columnar from GPS/GNSS only). For these ECVs demonstrable Baseline and Reference quality measurement networks are assured;
 - maximizing the number of users of the existing high-quality in-situ observing capabilities.

The successful implementation of the proposal will allow:

- the development of consistent quality control algorithms for in situ climate data arising from Baseline and Reference networks at various time scales (hourly, daily, monthly, annually).
- Methods will be developed and implemented to detect and adjust for inhomogeneities due to issues such as:
 - instrumentation changes,
 - calibration drifts,
 - observing station relocations,
- to provide/quantify uncertainty in a consistent and metrologically rigorous manner.



WP structure



C3S-BARON is to be executed through four work packages (WPs) which are directly responsive to the tasks as set forth in the ITT.

CNR is the solely responsible for the implementation of the whole Service.

Nevertheless, CNR will take advantage of the sub-contractors involved and of their specific expertise delegating specific responsibilities in the projects:

WP0 - Management (lead: CNR)

WP1 - Access to network data (lead: CNR)

WP2 - Data harmonization (lead: BKS)

WP3 - Data dissemination (lead: BIRA-IASB)

The WPs are further organized in tasks, each of which has an identified lead partner. All the proposed tasks are required to execute the work plan and fully achieve the objectives set forth in Section 3 of the Annex II.

The structure of the individual work packages is designed to maintain internal cohesion and exchange.



Work package title	Management				
Participants (person months)	CNR				
	33				

Main objectives

This work package has the following objectives:

- To organize and coordinate the Service work
- To carry out financial management, documentation and reporting
- To ensure the implementation of the work plan
- To communicate with ECMWF and Contractors of the other 311a lots
- To supervise the establishment of the products and services for C3S
- To clarify the role of participants and facilitate their collaboration
- To ensure the Service conforms to ECMWF technical requirements



WP1



Work package title	Access to network data				
Participants (person months)	CNR (lead)	BIRA	NUIM	UNIBRE	WMO
	24	2	4	4	12

Main objectives

This work package has the following objectives:

- Develop network inventories for Baseline and Reference networks taking advantage of the work implemented within the GAIA-CLIM project;
- Secure sustainable access to the data and metadata through a negotiation process with selected networks;
- Develop a governance structure and operating rules to allow for continued operation after the end of contract;
- Develop tool for the retrieval of the data and metadata for all the products routinely provided by the selected networks;
- Implementation of processes and tool to deal with network updates, changes in measurement practice, and other changes in data supply.

The Work Package is continuous and all the tasks of this work package will iterate on an annual basis to i) update existing inventories and arrangements and ii) expand the list of contributing data streams. This is related to the general Service work plan which aims at collecting network products in a phased manner such that lessons can be iteratively learned and user feedback incorporated using the time schedule reported in in Section 3.2 At the beginning of each year, WP1 will provide the basis for the subsequent work of WP2 and WP3.



WP2



Work package #	311a_Lot3.2				Start/End date			M4/M46
Work package title	Data harmonisation							
Participants (person months)	BKS (lead)	BIRA	CNR	NPL	NUIM	TUT	UNIBG	UNIBRE
	16	10	48	15	4	7	10	11

Main objectives

This work package has the following objectives:

- To prepare and merge data sets identified and received from multiple networks (cfr Section 3)
- To retain the complete identification of data records with full traceability to the data source and dataset versions, and processing steps with full traceability back to the data origin, and to enrich existing metadata where applicable
- To harmonise all data obtained from the different networks by using the ODB-based common data model adopted for observations and metadata including the standardization of data formats and metadata conventions

The Work Package activities will be carried out on a yearly basis after datasets are received from WP1 and all the tasks will iterate on an annual basis with WP1 providing the information on the respective network data access at the beginning of each year using the following schedule discussed in Section 3.2.

The homogenised datasets provided within WP2 will then be made available each year for dissemination under WP3.



WP3



Work package #	311a_Lot3.3				Start/End date	M1/M48
Work package title	Provision of data services					
Participants (person months)	BIRA (lead)	CNR	TUT	UNIBG	UNIBRE	
	18	24	8	5	4	

Main objectives

This work package has the following objectives:

- to provide the harmonized and possibly merged data sets and the associated metadata generated in WP2 for the target ECVs to the CDS and to update these at minimum on an annual basis; these datasets and associated metadata will be called climate data records (CDR) hereinafter;
- to additionally provide ancillary products to the CDS that support the exploitation and further processing of the CDR;
- to develop and provide software for web-service-based data handling facilities or processing capabilities for user applications, according to user requirements taken from the User Requirements Data Base (URDB) on a central processing server. The user will be able to invoke URDB through the CDS;
- to account for the evolution of user-requirements and user-feedbacks to extend and update the ancillary products and processing capabilities;
- to contribute to the C3S Service Desk facility by providing expert support and knowledge concerning the targeted ECV CDRs and the related services.

The Work Package activities are articulated in four tasks and will be carried out continuously for each ECV, however with different starting dates according to the schedule discussed in Section 3.2. The tasks can be adapted as the user requirements are refined.



Sub-contractors



NUIM	National University of Ireland, Maynooth	IE - Ireland	Public Sector Organisation
BIRA-IASB	Koninklijk Belgisch Instituut voor Ruimte Aeronomie - Institut royal d'Aéronomie Spatiale de Belgique	BE - Belgium	Public Sector Organisation
BKS	BK Scientific GmbH	DE - Germany	Private Sector Organisation
NPL	NPL Management Ltd	UK - United Kingdom	Public Sector Organisation
TUT	Tallinn University of Technology	EE - Estonia	University
UNIBG	Università degli studi di Bergamo	IT - Italy	University
UNIBRE	UNIVERSITÄT BREMEN	DE - Germany	University
WMO	Organisation Météorologique Mondiale	CH - Switzerland	Other

- 8 sub-contractors
- 4 EU countries + UK represented + WMO
- Variety of expertise including remote sensing experts, statisticians, ICT experts, metrologists,
- Redundancy in the specific expertise allows to minimize the risks.



Service budget

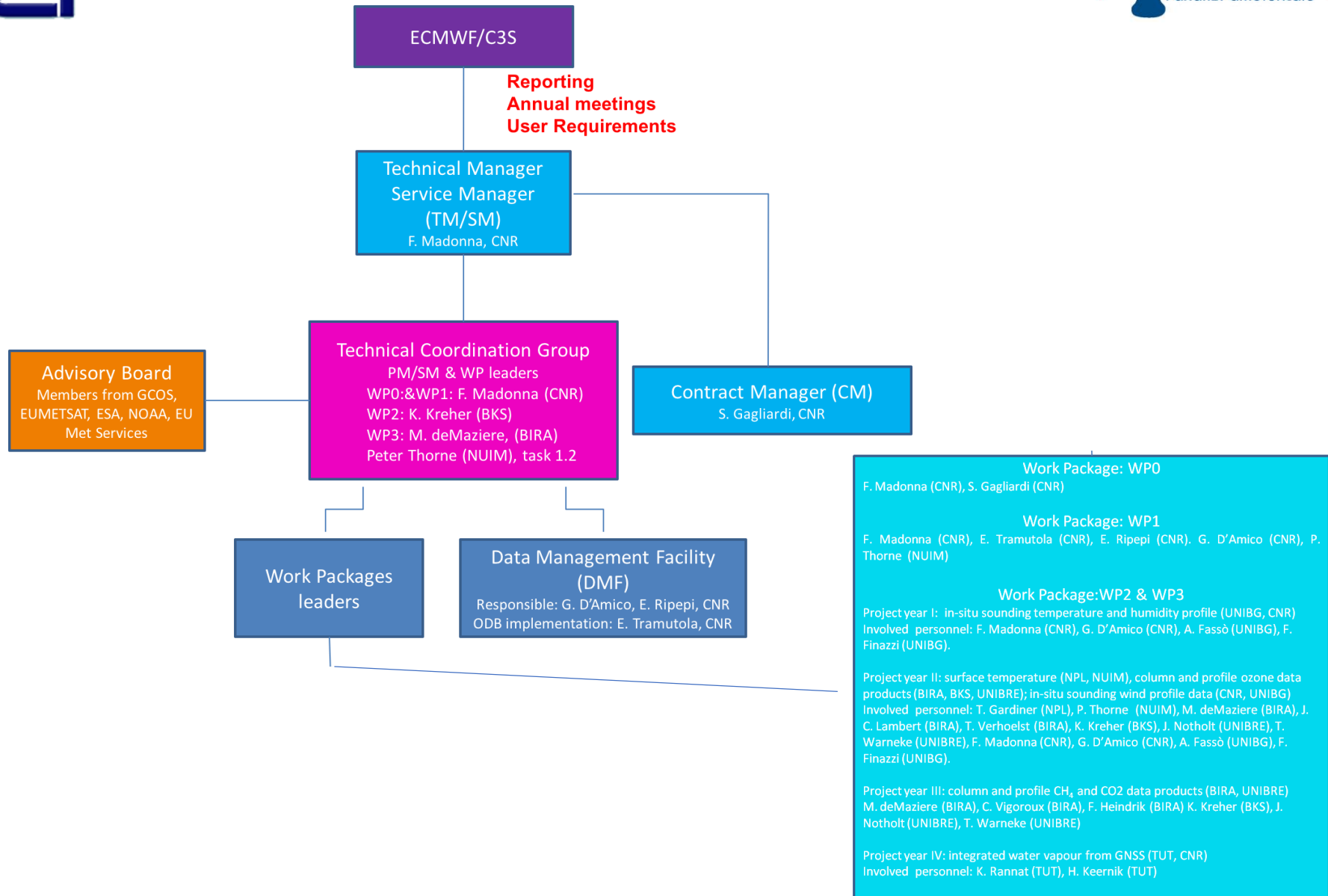


Workpackages	Person months	Payroll	Travel	Workshop	Computing	Professional Fees	Other	Total Price	2.085.247,51
Total	259,00	1.985.906,46	99.341,05	-	-	-	-	2.085.247,51	2.085.247,51
%		95,2%	4,8%	0,0%	0,0%	0,0%	0,0%	100%	
WP0	34,00	161.785,45	23.250,00	-	-	-	-	185.035,45	185.035,45
WP1	46,00	315.482,80	22.700,02	-	-	-	-	338.182,81	338.182,81
WP2	121,00	1.032.523,37	32.731,02	-	-	-	-	1.065.254,39	1.065.254,39
WP3	58,00	476.114,85	20.660,02	-	-	-	-	496.774,87	496.774,87
WP4	-	-	-	-	-	-	-	-	-
WP5	-	-	-	-	-	-	-	-	-
WP6	-	-	-	-	-	-	-	-	-
WP7	-	-	-	-	-	-	-	-	-
WP8	-	-	-	-	-	-	-	-	-
WP9	-	-	-	-	-	-	-	-	-
WP10	-	-	-	-	-	-	-	-	-
Subcontractors	Person months	Payroll	Travel	Workshop	Computing	Professional Fees	Other	Total Price	
Total	259,00	1.985.906,46	99.341,05	-	-	-	-	2.085.247,51	2.085.247,51
CNR	129,00	625.105,21	23.250,00	-	-	-	-	648.355,21	648.355,21
NUIM	8,00	117.775,06	7.800,00	-	-	-	-	125.575,06	125.575,06
BIRA-IASB	30,00	363.496,48	25.800,05	-	-	-	-	389.296,53	389.296,53
BKS	16,00	102.912,00	3.200,00	-	-	-	-	106.112,00	106.112,00
NPL	15,00	271.457,33	9.060,00	-	-	-	-	280.517,33	280.517,33
TUT	15,00	87.075,00	10.191,00	-	-	-	-	97.266,00	97.266,00
UNIBG	15,00	179.885,40	6.240,00	-	-	-	-	186.125,40	186.125,40
UNIBRE	19,00	148.200,00	4.800,00	-	-	-	-	153.000,00	153.000,00
WMO	12,00	90.000,00	9.000,00	-	-	-	-	99.000,00	99.000,00

- Management Work Package (WP0) is 8.8 % of the total.
- Fraction of costs is also kept for invitation of the advisory board.
- 74 % of the budget is allocated for the most operational work packages (WP2 and WP3).
- Most of the resources (97%) going into the Service are to cover direct personnel costs.
- Sub-contractors covers 69% of the total cost.



Organigram





Access to the data

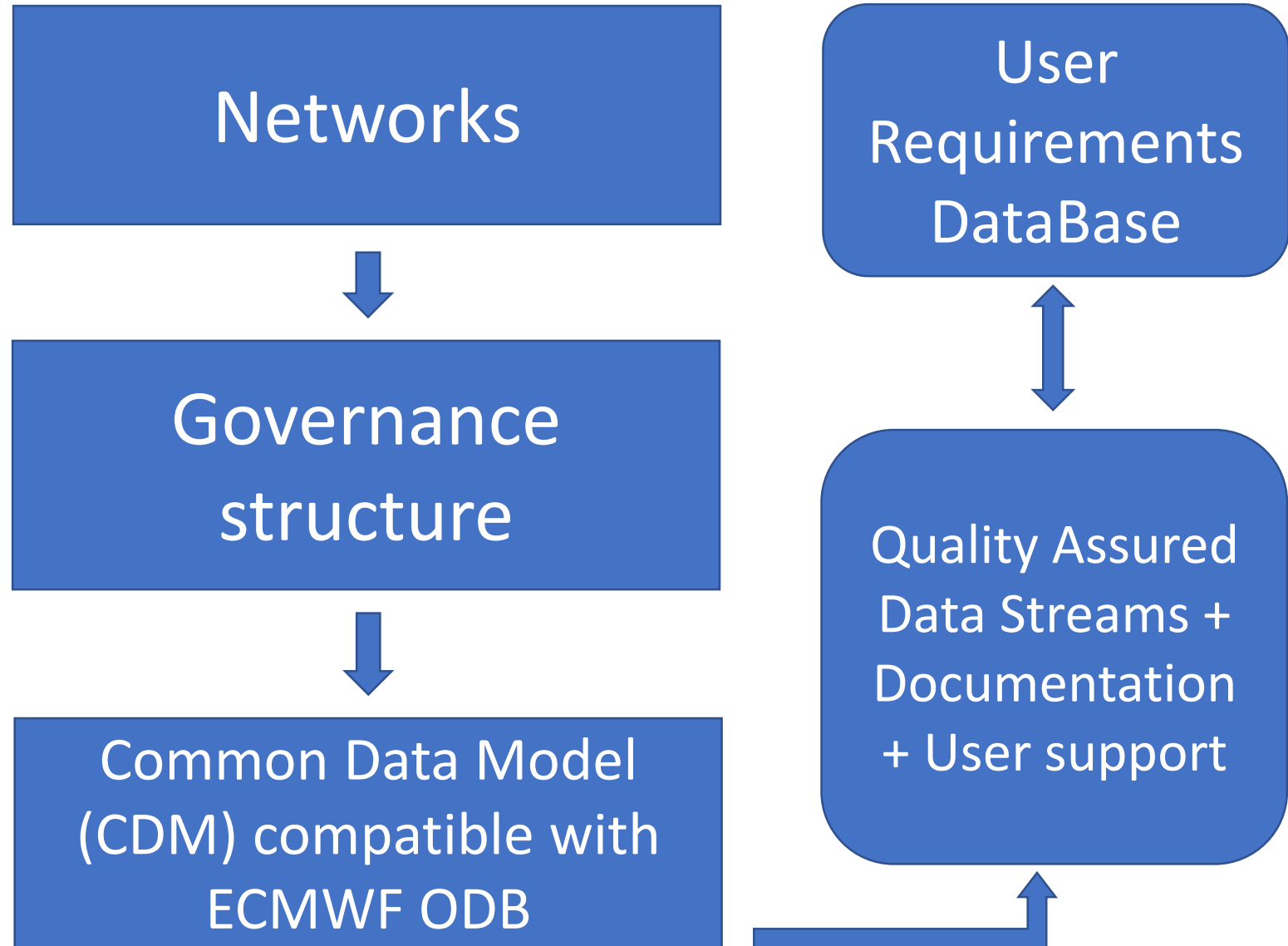


The following datasets/networks will be considered:

- Surface Temperature: USCRN, RBSN, GSN, RBCN;
- Temperature/humidity/wind (profiles): GRUAN, GUAN, RAOB;
- Ozone (concentration, columns and profiles): NDACC, SHADOZ, GAW Networks/WOUDC data center;
- CO, CO₂, CH₄ (concentration, columns and profiles): TCCON, GAW networks;
- Integrated water vapor (from GNSS zenith tropospheric delay only): IGS, EUREF, all international GNSS networks.



Technical Solution





Service Delivery: datasets



The following timeline has been considered for the four years of the project:

Service year I (03/2017-02/2018): in-situ sounding temperature and humidity profile data products;

Service year II (01/2018-12/2018): column and profile ozone data products, surface temperature, in-situ sounding wind profile data;

Service year III (01/2019-12/2019): column and profile CH₄, CO₂ and CO data products;

Service year IV (01/2020-12/2020): integrated water vapour from GNSS.

Inventory of the related network and first dataset of measurements will be provided 3 and 4 months after the beginning of new Service year, respectively.

The first dataset will be released at month 8 of each service year and the software packages at M8 (M10).

Datasets will be released in their final version at M12.

Updated on yearly basis.

- Service Specification Document (SSD) put together in parallel to URBD and updated accordingly;
- One technical document for each Reference and Baseline network summarizing the measurement type, retrieval algorithms, and products with special attention paid to the traceability and uncertainty for each considered measurement and product;
 - One guidance describing the algorithm for the time series harmonization;
 - A technical document describing the data and service offered;
 - A technical document describing the adopted metadata and data standards;
 - FAQs;
 - E-tutorials and demos (e.g. videos).
- Automatic reports (Product Specifications, Quality Reports, Synthesis reports, KPI and Post-production Analysis Reports)
- Specialized User Support (3 Tiers System)



IPR



Most of the networks (GRUAN, GUAN, RBCN, RBSN, GSN) refers to the following WMO resolution on the International exchange of data and products

- [Resolution 40 \(Cg-XII\)](#) - WMO policy and practice for the exchange of meteorological and related data and products including guidelines on the relationships in commercial meteorological activities.
- [Resolution 60 \(Cg-17\)](#) - WMO policy for the international exchange of climate data and products to support the implementation of the Global Framework for Climate Services (GFCS).

Specifically for the GAW (result of an internal discussion), a commercial service being developed is allowed as long as the regular GAW data remains open access.

Other networks like RAOB, TCCON or NDACC requires a specific negotiation upon the individual data policies of these networks.

GNSS networks EUREF, IGS does not have any big restrictions. EUREF data usage for any purpose must be approved by their data management office.

OBJECTIVE: Work on the governance with ECWMF to release the largest number of research datasets and define which products will become available for commercial purposes

ECMWF/C3S has shown the appropriate flexibility to accept in Lot3 also datasets which will not be used for commercial purposes, due their “research nature”.

EEA may be also able to establish mechanism to reward the data suppliers (e.g. networks).



Questions?