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JCOMMOPS Report

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Summary and Purpose of Document

This document provides a review of JCOMMOPS vision, infrastructure, activities, 2017 accounting budget, 2018/2019 anticipated budget, work plan and challenges.
JCOMM OCG and the Review Panel is invited to comment on this document, take note of recommendations and guide JCOMMOPS in order to:

i) prioritize the challenges and projects identified for 2018/19
ii) balance the services provided to networks vs contributions
iii) stabilize its infrastructure
iv) define and prepare the way(s) forward

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Executive Summary

JCOMMOPS has managed in the intersessional period to undertake its mission and deliver ambitious and tangible products, web based or classical, in support of the mission thanks to an efficient, creative, skilled and motivated team.

Highlights of the intersessional period include:

- A new generation of Information System, integrated metadata management and web applications
- Development of Key Performance Indicators to track network status and anticipated gaps
- Release of the JCOMM Report Card to communicate on OCG network status and value
- Enhanced responsibilities adopted at JCOMM V (see new ToR), and greater visibility.

The boost in resources provided by the Brittany region during 2015-2017 to support the Centre relocalisation was decisive in these achievements and enabled to establish a new staff position (Science & Administration/Communication), and enhance web development productivity through subcontracts.

JCOMMOPS is now well settled in Brest/Ifremer with support from CLS for its Information System, and after the high productivity period it has stabilized its deliverables and services.

Despite the achievements 2017 was a challenging year in terms of staff turnover and the management needed to take some difficult resourcing decisions in order to sustain momentum across the networks with regard to the overall work plan. This resulted in some misalignment of funding with resources utilised and will need to be addressed moving forward.

For the work plan and budget JCOMMOPS uses the 'regular' funding and expenditure to assess its status. This shows that JCOMMOPS currently operates at a loss of order -60K$ (2017 and for 2018). This can be sustained for the next financial year but unlikely beyond. For a yearly operational budget of about 650 k$ JCOMMOPS has however always more than a year of surplus[1] which is currently required in order to secure staff contracts under the rules of IOC and WMO trust funds (all contracts fully funded at start of financial year).

In addition there is a misalignment between the regular funding received from some networks and the anticipated resource available as per the Terms of Reference (TORs) of JCOMMOPS staff, this also cannot continue. For 2018 - 2019 JCOMMOPS proposes a budget (2018) and work plan (intersessional period), which sees JCOMMOPS allocated funding being utilised to support specific networks, that have a shortfall between their funding level and resource requirements, and 2-3 cross-network projects. This is a short term solution seen as necessary to enable JCOMMOPS to fulfill its core aims and functions, however it cannot continue as the distribution is in-equal and does not leave JCOMMOPS the resource to move its development forward, as its core funding is spent on network support.

[1] Not anymore after 2018 proposed budget

For the future JCOMMOPS proposes some models of funding for discussion:

- Set levels of funding for resource identified (25% time) and these 'target' amounts are what the networks achieve in terms of funding and receive in terms of support. JCOMMOPS allocated funding is used to move JCOMMOPS development forward through agreed projects
- A % of network funding goes towards the JCOMMOPS integrated development
- All funding received is utilised as JCOMMOPS integrated funding according to an agreed Workplan, approved by OCG and the networks on an annual basis
- IOC (GOOS), WMO, or other bodies with an integrated view find additional funding to support the development of integrated metadata

In addition JCOMMOPS faces some key challenges related to the structure of the funding and governance that should also be discussed:

- staff turnover and lack of consistency of staff for specific network
- function of trust funds that ties up resource (550K$) in provision for staff contracts

JCOMMOPS proposes a vision for future development based around 3 core goals:

- Reach its metadata 'gold' standard for all networks itemized in its initial ToR:
- Expand its support and monitoring capacity; to new OCG networks and develop a regional pilot
- Enable a responsive and truly global monitoring system

These are ambitious and for discussion, however in order to be able to move towards these goals the issues above will need to be resolved. JCOMMOPS and OCG welcome the input of the Review Panel into these complex issues.

1. Overview and Objectives

JCOMMOPS has now been in operation for 17 years and the impact of its work can be seen in the visibility to give to the global networks through its web site and graphics, the knowledge we have about the level and consistency of metadata in the global observing system, and the specific support around data and metadata flow provided to individual OCG networks. Notwithstanding the resource and infrastructure environment for JCOMMOPS remains challenging, specifically around consistency of funding and staff contracts (addressed in detail later). The foundations are however solid and its achievements since the move to Brest have included the development of a stable Information System and comprehensive Web-based tools. With this completed the new generation information system at JCOMMOPS is now ready and capable of addressing the complex monitoring requirements of the the global ocean observing system.

With these tools in place the ability to generate an integrated and cross platform perspective is within reach, given further effort on ensuring metadata delivery for some network elements, which is an important aspect of the ongoing and strong collaboration between the networks and JCOMMOPS.

Investment in I.T. and resulting innovation and creativity is important for JCOMMOPS, and it will continue through specific, targeted projects, subject to the availability of financial resources and stakeholder requirements.

Recently JCOMMOPS has been involved in national and multinational projects (e.g. AtlantOS), which further enables cooperation with network implementers, improves JCOMMOPS visibility, set deadlines for deliverables in line with its mandate, and provides a complementary funding source. Consequently, a number of partners now include some funding within project work packages for JCOMMOPS, especially in the EU context, which is a welcome additional source of both JCOMMOPS core and network focused funding.

The JCOMM OCG Vision, endorsed through JCOMM-V Decision 22 (JCOMM-5), the consequent update of JCOMMOPS Terms of Reference through Recommendation 6 (JCOMM-5) and the network chairs vision for their observing system requirements has increased substantially JCOMMOPS visibility, responsibilities, expectations, while clarifying its governance. JCOMMOPS mission is (1) to provide support with regard to implementation of ocean observing networks, and planning for the deployment of instruments at sea; (2) to support consistency and mechanisms for exchange of ocean observing station data/metadata; and (3) to develop and maintain an ocean observation system monitoring tool. (JCOMM-5 New JCOMMOPS TORs).

At OCG-8 and ratified in JCOMM-5 it was recommended that (1) That an external review of JCOMMOPS be undertaken to assess a) the future role of JCOMMOPS b) organizational relationship with sponsors and stakeholders and c) future sponsorship and management; this is now underway and OCG and JCOMMOPS invites the the Review Panel to address the following questions:

- What should be JCOMMOPS priorities according to its mission ?

- What's missing, what are the gaps and new services and/or products that JCOMMOPS could deliver
- How the evolving IT development requirements of JCOMMOPS should be addressed ?
- How can JCOMMOPS governance enable further integrated initiatives ?
- What is JCOMMOPS Vision in 2030, how to develop such Vision and then address it ?

1.Key objectives: short and long term

JCOMMOPS suggests the following goals could form the backbone of the JCOMMOPS roadmap over the next 5-10 years, in alignment with its ToR:

i) Reach its metadata 'gold' standard for all networks itemized in its initial ToR:

The lifeblood of JCOMMOPS monitoring capacity is the management of "**quality and integrated metadata**" gathered through direct contact with implementers, which enables rigorous monitoring and performance evaluation and planning tools, for network decisions and communication. **Develop standard metadata services and connect them further to standard data services.** (See the note on metadata in annex).

ii) Expand its support and monitoring capacity; to new OCG networks and develop a regional pilot

Over the medium run, JCOMMOPS should expand its services to new or emerging networks cooperating within OCG. In addition JCOMMOPS would like to initiate a pilot project for a key region, which would enable monitoring metrics to be further developed.

iii) Enabling a responsive and truly global monitoring system
Over the long term, JCOMMOPS could expand its monitoring capacity to most of GOOS regions, and give visibility and monitoring capability to a cluster of coastal observing systems, with the cooperation of national focal points. New data sources could be enabled globally through JCOMMOPS technical assistance, and new synergies between regional and global initiatives could be encouraged.

To succeed in addressing these challenges, JCOMMOPS will need to:

i) Review core priorities for JCOMMOPS and personnel through discussion with the networks and OCG, and with the input of the JCOMMOPS Review Panel, to find the resource required to resolve metadata gaps in the 2018/19 workplan;

ii) identify new funding sources to raise its budget to meet current resourcing needs and future challenges (see section 4, financial forward plan)

iii) Initiate discussions with regional partners (e.g. GOOS Regional Alliances, WMO Regions) to find a pilot region to test. Seek in-kind or funding support in regions that would support the work with JCOMMOPS system and enable regional and coastal monitoring. There are potential fundings in sight for some regions.

The vision is simple:
Give body, structure and take the pulse of the Global Observing System, "certifying" every component that is operating, or will operate in the ocean. Every implementer should make sure its system(s) are tracked by JCOMMOPS and thus benefit from appropriate tools to monitor, manage and promote them.

2 Highlights for 2017

JCOMMOPS has managed to achieve some important tasks in 2017, including the following examples:

Metadata

- In 2017 JCOMMOPS has been able to report and analyze the Argo network implementation status in depth (see 2017 report & 2018 presentation). When the tool box is operational, the Technical Coordinator can spend much more time in analyzing rather than producing the tools, and then provide useful recommendations for the Steering Team and early gaps detection.

- The other networks need much more work on metadata quality before enabling such reporting. This is why JCOMMOPS has been putting a lot of efforts in addressing the metadata issues for these Networks. This information management is now on the rails for DBCP, OceanSITEs and SOT. It needs a strong and labour intensive work by the respective TCs to check the metadata quality and help the community to use the central system.

- There was active discussions with OceanSITES to develop the metadata management at JCOMMOPS. A set of teleconferences with Data team and key experts was used to finalize our database and web site, and start to define reference tables.
  A number of key SITES were registered to test and finalize the interface.
  OceanSITES platforms are rather complex in term of instrumentation and this work will be very useful beyond this Network. There are very rich cruise reports on-line that capture all information aside moorings maintenance that could be exploited further.

- A substantial effort was produced to support the SOT metadata management.
  The system initially set up at Meteo-France/ESURFMAR for PUB 47 metadata was migrated to JCOMMOPS infrastructure through a rather transparent process for users.
  In parallel the SOT management within the JCOMMOPS integrated database/web was being finalized.

- As the Ship Coordinator was replaced temporarily by a data manager, this was an ideal opportunity to boost this task, in conjunction with the work of the Web developer, the IT Engineer and the Lead. Actually the Web developer contract payment was shifted on 2018 budget but most of the work was achieved late 2017.

- A global survey of Pub47 historical metadata was achieved to define new requirements for JCOMMOPS, rationalize the content through reference tables, and develop a new web service to facilitate operators work.

- In parallel, the work on DBCP moored buoys metadata started and the JCOMMOPS system is ready to handle the information properly (priority for DBCP).

- A substantial work was achieved for GO-SHIP, with the archiving of all WOCE and CLIVAR cruises (including variables measured) and many ad hoc information that are cross-programmes and complete the integrated database. A lot of information needs now to be exploited to develop indicators and routine monitoring products .

- The gathering of cruise plans was made but not fully completed. The community starts as well to register the cruise plans directly.

JCOMM V

JCOMM conference has been an opportunity to review key documents for JCOMMOPS. The Centre visibility was clearly elevated by co-presidents and secretariats and JCOMMOPS has gained now some important responsibilities (see 2018/19 workplan and updated ToR). The preparation of submission of metadata to WIGOS was tested in close cooperation with the WIGOS/OSCAR development team and evolve gradually with new requirements and specifications.

I.T. Web Developments

As mentioned above many developments were made in line with the metadata management. Since JCOMMOPS had almost a full time web developer along 2017, updates have been made almost daily on JCOMMOPS websites.
It is recalled that there is one single application to drive all JCOMMOPS websites. Access to the these websites specialized by Network is only triggering a filter on the system elements and a few specificities.
Any development made is in theory available for all Networks, provided they have the metadata ready.

The feedback from the community on the new web application is varied and sometimes “extreme”. It is improving but is calling for a strong communication and regular interaction with users.

The integrated vocabulary used is challenging for different communities. Hence JCOMMOPS is building up a help desk, including vocabulary definitions and tutorials.

Progress was made on the GIS engine to test some 3D capacities for the monitoring and would deserve to be further investigated for outreach.

KPIs

The development of KPIs is gradually progressing as long as Networks define their targets and interact with their TC.
Indicators have been regionalized to have clear view on smaller basins.
So far about 400 indicators (and time series) are ready and updated routinely.
The interfaces allows many comparisons between the indicators and can be embedded on any website (as most of existing monitoring tools available on www.jcommops.org)

Communication

A set of webinars was made to engage discussion with community around the JCOMMOPS and its website. This will need to continue, and routinely if possible.

The first JCOMM Report Card 2016 (www.jcommops.org/reportcard) was released during JCOMM V conference after an active work within JCOMMOPS and with the OCG Report Card Editorial Board. The JCOMM Report Card 2016 was the first ever effort by JCOMM to standardize and publish the annual status and health of the Global Ocean Observing System. The Report Card 2016 assessed: the status of the observing system, in term of international contribution and performance; and the value of the system, critical for many applications and socio-economic needs.

An outreach workshop, the 1st Ocean Observers Workshop, was successfully hosted in Brest in June 2017 to bring together ocean scientists, educational authorities and teachers, marine communicators, sailing community and other stakeholders (public, policy-makers, and etc.), who were willing to share marine science educational resources and experiences for exploring the possibilities to establish new international collaborative activities. A key focus of the initiative is to gather and share experience on educational activities related to in situ ocean observations, to be able in the longer term, to assemble all educational materials in a unique repository under the UNESCO auspices. (More details at: www.oceanobservers.org)

During the Volvo Ocean Race 2017-2017, JCOMMOPS teamed up with an international group of meteorologists, oceanographers and the Volvo Ocean Race skippers to use “sailing ships of opportunity” to gather data away from the main shipping routes. In particular, during the Volvo Ocean Race, the racing yachts were committed to acquire metocean data. The meteorological data and metadata collected by the Volvo Ocean Race vessels were made available in near-real time to the public and to met-offices providing weather forecasts as part of a pilot project developed by JCOMM partners. During 4 of the Volvo Ocean

Race legs, a total of 28 drifter buoys from the National Oceanic and Atmospheric Administration drifter program were deployed by each of the 7 vessels, at crucial oceanic regions to measure sea surface temperature and ocean current velocities.
A number if similar partnerships are being prepared and could offer some sponsoring opportunities (for instruments).

Projects

JCOMMOPS has been delivering what was expected by its AtlantOS work package with a very good rating through the review process: A full dashboard is enabled to monitor the AtlantOS system. See: http://www.jcommops.org/board?t=atlantos

JCOMMOPS has started to participate in the TRUSTED project, funded by EUMETSAT, and led by CLS together with MeteoFrance, SHOM, NKE and BSH to deploy 150 HR SST drifters. JCOMMOPS will develop the metadata format and flow from manufacturer to user within the DBCP context. This is an ideal project for the team and the new Technical Coordinator to develop its expertise along a substantial contribution to the Global Drifter Array, with link to the HRSST pilot project.

3. Infrastructure and Associated Challenges

3.1 Infrastructure

3.1.1 Office

Currently, the office and staff are physically located in Brest Science Park within Ifremer campus while its Information System is in Toulouse within CLS/CNES cloud. In addition one staff is in Geneva for administrative reasons. Working efficiently on a decentralised basis is proving difficult across the JCOMMOPS technical tasks, ideally all staff would be located at Brest, where interactions between staff and synergy across platforms can be optimised.

3.1.2 Information Technology (I.T.)

JCOMMOPS has been investing in I.T. developments in the last few years to finalize its new generation of Information System and websites.
It is recalled that JCOMMOPS handles a very complex and ambitious I.T. infrastructure, developed and operated by a small team and with only one I.T. engineer. Except for high developments undertaken about every ten years, one IT engineer would normally be sufficient to maintain and operate the system. Indeed, the TCs are not expected to have IT development skills but rather a strong interest in metadata and web services and capacity to specify some developments when needed.

JCOMMOPS believes that investing in the I.T. developments, maintenance and operations is critical to meet its ToR:

- Real-time monitoring and evaluation of the GOOS cannot be achieved through an excel table.
- Visibility of the observing system cannot be readily communicated without a decent website, and creative or innovative I.T. developments.
- It does not serve WMO/WIGOS/OSCAR with all marine metadata without a complex and operational IT infrastructure.

I.T. is one of the foundations of JCOMMOPS. Our website is our main cooperation tool with our community. We will need to keep improving it , adapt it to the growing requirements, and the OCG extensions and communicate to educate users and get feedback. While we are reducing the sail as the high productivity period is ending, we should not underestimate the importance of this pilar.

JCOMMOPS should also prepare the move of its I.T. infrastructure from Toulouse to Brest but this would require an impact and cost study. The current contract with CLS provides JCOMMOPS with an operational and high quality I.T. architecture, together with a full time staff and with strong in-kind support. A migration of the architecture on the medium term makes senses and will unlock new potentials, but cost is unknown, and will require negotiations with Ifremer.

Given the system has reached a good level of maturity, JCOMMOPS invites OCG and the Review Panel to give its perspective and advise on its Vision for JCOMMOPS with regard to I.T. development requirements and related funding mechanism in the few years.

3.1.3 Sponsors and Partners

JCOMMOPS benefits as well from the support of its two parent international organizations IOC/UNESCO GOOS project office, and WMO Observing Systems Division (OSD) through guidance from headquarters staff, and management of most of staff contracts.

It benefits also from a number of opportunities offered by local partners (e.g. free access to Oceanopolis aquarium conference room) and local GOOS/JCOMM partners. Synergies with Coriolis (the French ocean observations data centre), EuroArgo, data managers, scientist working on R&D projects around in-situ observations are developed gradually.

The office space and general means are provided at no direct cost for JCOMMOPS by Ifremer.

The main weakness of the infrastructure today is the lack of general MoU that would define the status of JCOMMOPS, and the role of all partners. For example, an MoU would enable further development of partnerships and JCOMMOPS participation in specific projects (e.g. European Union funded).

3.1.4 Staff

5 staff positions are supporting the JCOMMOPS activities, and one extra staff completed the team in the last year. These resources are theoretically allocated to network and JCOMMOPS core activities in alignment with the Terms of Reference (TORs) for the positions, as shown in Table 2 below:

FTE / ToR	Argo	DBCP	OceanSITES	SOT	GO-SHIP	JCOMMOPS	TOTAL	
Lead/Argo (M. Belbéoch)	0.67					0.33	1	core
DBCP/OceanSITES (L. Jiang)		0.67	0.33				1	core
SOT/GOSHIP/Cruises (M. Kramp/ M. Krieger)				0.33	0.33	0.34	1	core
I.T. Engineer (A. Lizé)						1	1	core
Administration, Sc. & Communication (E. Rusciano)						1	1	core
Web Developer (T. Latter)						1	1	temp

***Table 1**: JCOMMOPS positions and % of time allocated to networks/JCOMMOPS core activities, according to the position Terms of Reference (TOR).*

In 2017, seven people supported these 5 functions, as shown in Table 2, including the work distribution (% of time) by network, as gathered through feedback from staff.

FTE/2017	Argo	DBCP	SOT	OceanSITES	GO-SHIP	2017 months	seniority

Lead/Argo	0.40	0.17	0.18	0.18	0.09	12	17
DBCP/OceanSITES		0.67		0.33		2	0.1
SOT/GO-SHIP/Cruises	0.02	0.02	0.80	0.02	0.13	11	4.5 (0.2)
I.T. Engineer	0.10	0.20	0.30	0.35	0.05	12	3.5
Administration, Communication	0.18	0.28	0.18	0.18	0.18	12	2.3
Web Developer	0.1	0.2	0.30	0.35	0.05	12	4

***Table 2**: JCOMMOPS 2017 personnel work distribution estimate by network*

Staff movement has left vacant positions during some relatively short periods, however because the JCOMMOPS personnel capacity remains modest this had an impact on JCOMMOPS operations and network support. The impact was generally split across the supported networks, later in this document OCG is invited to advise whether this was the right approach, or whether the provided support should in future be aligned more closely with the contributions. However, it is JCOMMOPS preference to keep an integrated perspective as a driver above all, to ensure core services and visibility for all networks, and promote projects funded on ad hoc basis as long as they are compliant with the agreed JCOMMOPS mission.

3.2 Way of working

The way of working is rather horizontal, based on a strong team work to achieve the short to long term challenges set by the Lead according to ToR and OCG vision and priorities, in continuous discussion with the team. This works well, staff are highly motivated to achieve the common objectives. The staff are autonomous in delivering a quality work and regular meetings allows for a regular review of the priorities and integrated goals or deliverables, and cto heck deadlines can be reasonably achieved.

Despite contractual challenges, everyone is cooperating to develop the structure and services and often contribute beyond the ToRs for the common interest.

4. Financial Report

4.1 Background

There are now 5 funds into which nations, projects, regions and companies deposit their voluntary contributions on a generally annual basis:

- IOC/UNESCO JCOMMOPS Trust Fund
- IOC/UNESCO AtlantOS Trust Fund
- WMO/JCOMM Trust Fund
- WMO/DBCP/JCOMMOPS Trust Fund
- CLS held Fund

Each of the funds functions differently, with different constraints, limitations and overheads.

Fund charges per annum are as follows, IOC Trust funds 10% (should be reducing to 7% in 2018), WMO DBCP Trust Fund 3%, JCOMM Trust Fund 7%, CLS managed fund 0%. The average overhead on JCOMMOPS integrated budget is 6%.

The JCOMMOPS accounts are managed in $ as the operating current common to WMO and IOC, funds are received, converted and also spent in different currencies. For budgeting purposes a set conversion rate is used between $, € and CHF, however it should be noted that exchange rate fluctuations can result in gains and losses that are not accounted for here.

In 2017 some changes were made to the WMO/DBCP Trust Fund that it is relevant to note and understand. This Trust Fund became a multi-fund trust fund and funders can now choose how to allocate their funds against 3 named projects within the fund:, DBCP,SOT, and JCOMMOPS governed respectively by DBCP, SOT and JCOMM OCG together with secretariats. If a funder does not specify the allocation ratio then the funds are split in the following ratio (JCOMMOPS 61%, DBCP 31% and SOT 8%). Carry forward will now be by project. Previously all carry over was allocated by DBCP to different activities of DBCP, SOT and JCOMMOPS). **These are major changes that are mechanically increasing DBCP and SOT contributions into JCOMMOPS, and clarifying the management of the overall JCOMMOPS budget.** In practice, allocations of the DBCP/JCOMMOPS expenses for the coming years are proposed to OCG for decision in the anticipated budget section further below, based on inputs by Panels and JCOMMOPS.

CLS is both a JCOMMOPS funder (through in-kind support), a manager of a fund for JCOMMOPS and a contractor. A yearly contract (80k euros in 2017)[2], provides a full time engineer dedicated to JCOMMOPS (and considered as a staff member) and an I.T. infrastructure hosted within CLS/CNES operational architecture, together with office computers for all staff. This fund is managed in practice by JCOMMOPS and CLS through quarterly budget reviews and a rigorous tracking since 2001 of all incomes and expenses. It is to be noted that this fund management offered by CLS is important to i) receive contributions that cannot reach IOC or WMO for some reasons and ii) enable expenses that are very difficult or impossible to achieve efficiently with international organizations. CLS has a long professional relationship with JCOMMOPS and has been a key element in its development. But the company has evolved in a large group of 700 employees. The shareholders distribution is changing, and incomes gathered through Argos air-time have reduced (DBCP switch to Iridium). Hence the level of resources to be potentially reinjected in the GOOS community, and into JCOMMOPS may became more limited. We have to expect a decrease of the in-kind support provided by CLS (estimated to 70k$ today) and prepare the future.

4.2 JCOMMOPS Operational Budget

Every year can be slightly different with regard to contributions or expenses. Contributors fiscal years or staff turnover can shift the budget elements along different calendar years. We estimate however our operational budget, with regular contributions and regular expenses as shown in Table 4 below.

JCOMMOPS operational budget, without any specific development or investment is about 640K$ per year, the networks contribute approximately 455K$ through various national voluntary contribution and JCOMMOPS integrated contributions of approximately 125K$ are provided by the USA and France. Contributions made available through the participation to projects, in line with JCOMMOPS ToR, and in particular EU funded projects, is slowly developing and offers an additional source of funding for JCOMMOPS work, both core and network. A 3 year grant provided by the Brittany regional authorities has now ended and we should re-establish the contact to sustain this contribution as far as possible.

The first key point to note from Table 3 is that overall, **JCOMMOPS operational budget is short of the order of 60k$ (10%)**.

Item / US$	**GENERIC**
CONTRIBUTIONS	
Networks Regular Contributions	**454,000**
JCOMMOPS Regular Contributions	**126,000**

[2] *Contract was just negotiated for next 3 years: 85k€ in 2018, 90k€ in 2019, 95k€ in 2020.*

TOTAL REGULAR CONTRIBUTIONS	**580,000**
EXPENSES	
TC Argo / JCOMMOPS Lead position	160,000
TC DBCP / OceanSITES position	110,000
TC SOT/GO-SHIP/Cruises position	110,000
I.T. Engineer position *	70,000
TC Science Communication position	50,000
TOTAL STAFF	**500,000**
TC Argo/JCOMMOPS travels	20,000
TC DBCP/OceanSITES travels	20,000
TC SOT/GO-SHIP travels	15,000
I.T. Engineer travels	5,000
TC Science Communication travels	5,000
TOTAL MISSION	**65,000**
I.T. Hosting (Cloud)	30,000
Activities (meetings, supplies)	10,000
TOTAL INFRASTRUCTURE	**40,000**
OVERHEAD**	**36,300**
TOTAL OPERATIONAL BUDGET	**641,300**
BALANCE	
ALL CONTRIBUTIONS vs OPERATIONAL BUDGET	**-61,300**

Table 3: A typical JCOMMOPS yearly core budget, this shows the staff and core activity, without the addition of cross-network projects e.g. the JCOMMOPS Report Card.

However this generic budget does not include important activities such as the Report Card production that could actually enter in the core deliverables, other specific I.T. developments, or support to emerging networks to develop their metadata, integration and visibility. Project work can be from 0 to 100K$ per year, provided additional funds are available. However they are important to the evolution and further development of JCOMMOPS.

4.3 Accounting 2017 - Actual

This was prepared and reviewed by the secretariats and JCOMMOPS. Note below a few key rules with regard to the annual accounting:

All contributions are tracked and labelled by the donor country, and the donor network. One approximation is made with the ESURFMAR contribution which is counted as "European Union" and is included with other true EU funding (e.g. AtlantOS, EuroArgo), when in reality it is a funding from a cooperative of European countries, and not strictly a European Union funding.

Incoming funds are tagged when they hit the different trust funds. For administrative reasons contributions for a fiscal Year (N) can arrive at calendar year (N+1).

The staff working time is not represented as given by the staff position ToRs, but reflects the reality of the work activity based on staff feedback (Table 4).

Incomes and expenses are tagged by Network, or JCOMMOPS.

Finally, any carry forward remaining in the JCOMMOPS Trust Funds is not labelled by network, and automatically becomes "JCOMMOPS" for the following year.

4.3.1 Funding

The total funding received in 2017 was 908k$, the figures below show how it was split by country and by network. This jump in funding relative to the previous years is explained by the US contribution, which was for 2 fiscal years (2017 and 2018). We also note the increased contributions made by Italy, China (announced at last OCG), and EuroArgo, as well increased contributions by all DBCP/SOT contributors.

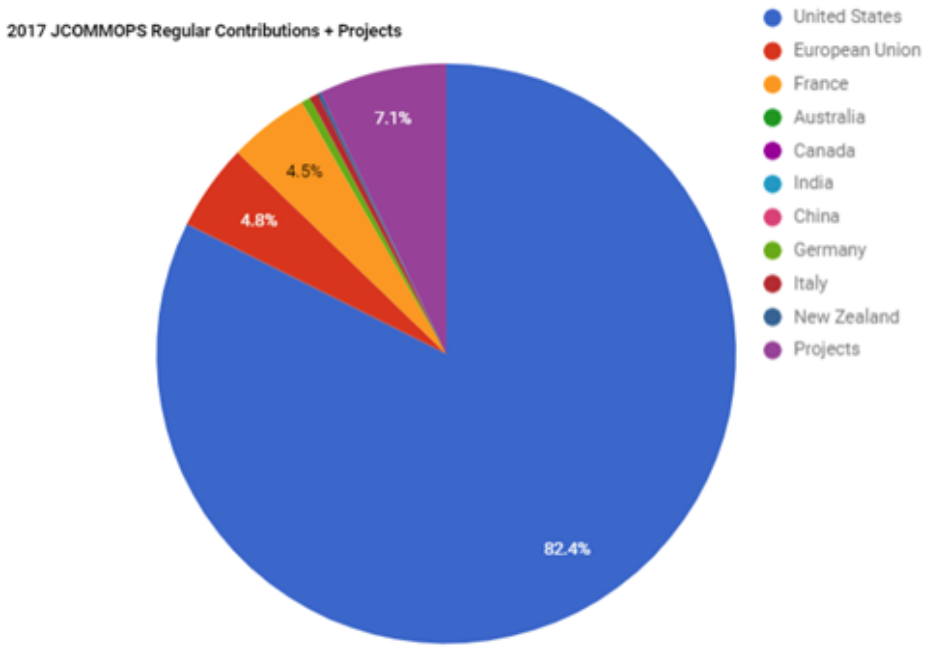

Figure 1: 2017 JCOMMOPS Regular Contributions and Extra Projects contributions

The 2017 distribution by donor country is impacted by the double US contribution and does not provide us with a good view of the international diversity supporting JCOMMOPS, and of the French support in particular. The international diversity of funding sources is not achieved for all networks and suggests that action should be taken to broaden/diversify funding base of some networks.

The financial support previously provided by Britanny local authorities ended in 2017 (100K €/year), meaning that the support from the host country, France, into JCOMMOPS has decreased substantially. Approximately two thirds of this regional funding was used for developments, the remainder was absorbed by core expenses (staff salary) to cover the shortfall in some network funding of staff positions (see Section 5 for more details). If we sum up all French contributions into JCOMMOPS, including a third of the E-SURFMAR contribution (estimation), it is approximately 40K$ per year, with an operational budget of 600k$ this mean the host country is now supporting JCOMMOPS at a level of approximately 7%. This level of funding from a host country is one area that should be addressed. Above direct funding, French partners have supported JCOMMOPS participation in projects, e.g. AtlantOS (French WP leader included JCOMMOPS early in the process), TRUSTED (150 HRSST drifters project funded by EUMETSAT and led by CLS) and Euro Argo has just submitted a proposal with several work packages for JCOMMOPS (hardware performance monitoring, data display R&D, EEZ guidelines, educational and outreach).

With regard to funding received by network, Argo (+15k$), DBCP (+20), and SOT (+20) all increased their funding compared to 2016, OceanSITES and GO-SHIP did not.

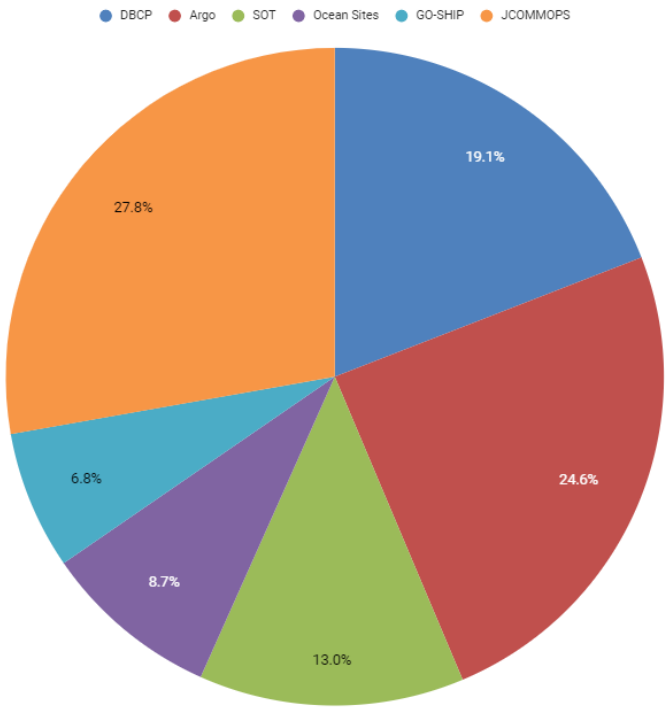

Figure 2: Contributions by Networks

4.3.2 Funding vs expenditure by network

The overall view of funding vs. expenses in US$ by network (Fig. 3) provides the following perspectives on 2017 activities in addition to staff work distribution (see Table 2).

The double US contribution is also impacting the distribution in Fig. 3 by increasing artificially the incomes, and thus decreasing the value added for networks as this additional contribution was not used.

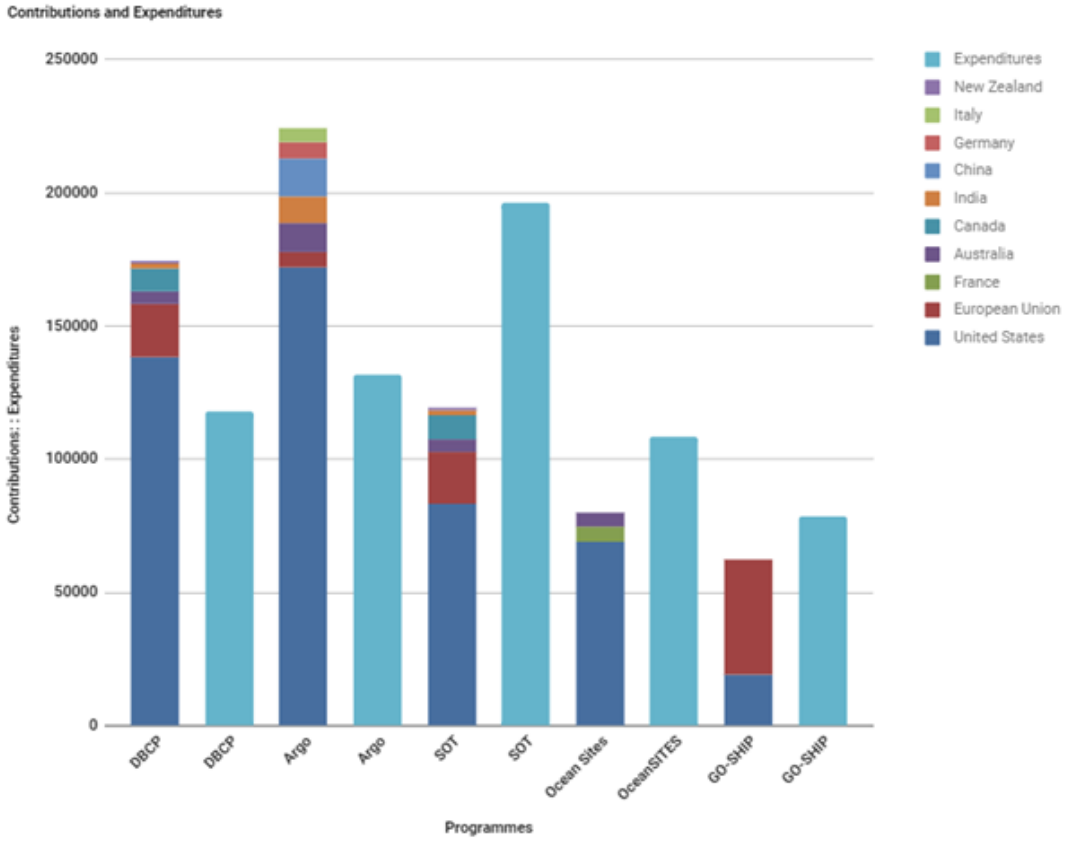

Figure 3: 2017 funding less expenditures (color code based on countries) for the networks, the JCOMMOPS contributions less expenses are not included in this figure.

SOT had the strongest value added of the common infrastructure in 2017, together with OceanSITES. DBCP suffered from a lack of dedicated staff, and also Argo.

Figure 3 indicates that:

- DBCP had a lower support, but reasonable given the lack of dedicated TC for 10 months
- Argo suffered from a lack of support in 2017 mainly through the lower dedicated activities by its TC, this will be addressed and rebalanced in 2018 Workplan.
- SOT had the strongest support in 2017, despite a 1 month gap in the dedicated staff.
- OceanSITES had very good support as compared to their contributions and in absence of a dedicated TC
- GO-SHIP had a reasonable support

It should be noted that this view does show the 5k$ financial support provided by GLOSS through the US contribution. Activities in support of GLOSS and other emerging network have happened in 2017, but are too marginal to be visible in these charts. However we will report on these from 2018 onwards as more activities, driven by the needs of the Report Card, took place.

In addition, this view does not show the value added of core and cross-network JCOMMOPS activity towards the integrated system promotion, beyond the funding networks. However more than half of the staff reported work distribution (53%) is addressing integrated goals (see Table 2), which is a positive indication of the integrated work.

4.3.3 Expenditure

The view on expenditures by type shows that the payroll is approximately 70% of the yearly budget. In the case of a full year, the percentage would grow to almost 80% (see table 5). In 2017 the I.T. developments used 10% of the budget, however this will decrease in 2018. Then the infrastructure cost is 7% (there is an in-kind part of the same order, not shown). Financial charges for the Trust Funds are not neglectable at 6.2%.

The mission budget (travel) with 6% is one small variable of adjustment, along with the I.T. developments, the team are using more and more videoconferencing capacities. Communication expenses are only 2% today (Report Card and meetings organization mainly), this might be raised slightly in the future.

Finally the “Ship time” is marginal (0.1%) and comes from the JCOMMOPS activity to generate deployment opportunities for its community by buying ship time (through partnerships with NGOs e.g.) and providing it back to implementers at low cost. This activity has a positive balance but is not currently expanding, it was successful about 6 years ago and generated benefits that enabled JCOMMOPS to hire a full time ship coordinator.

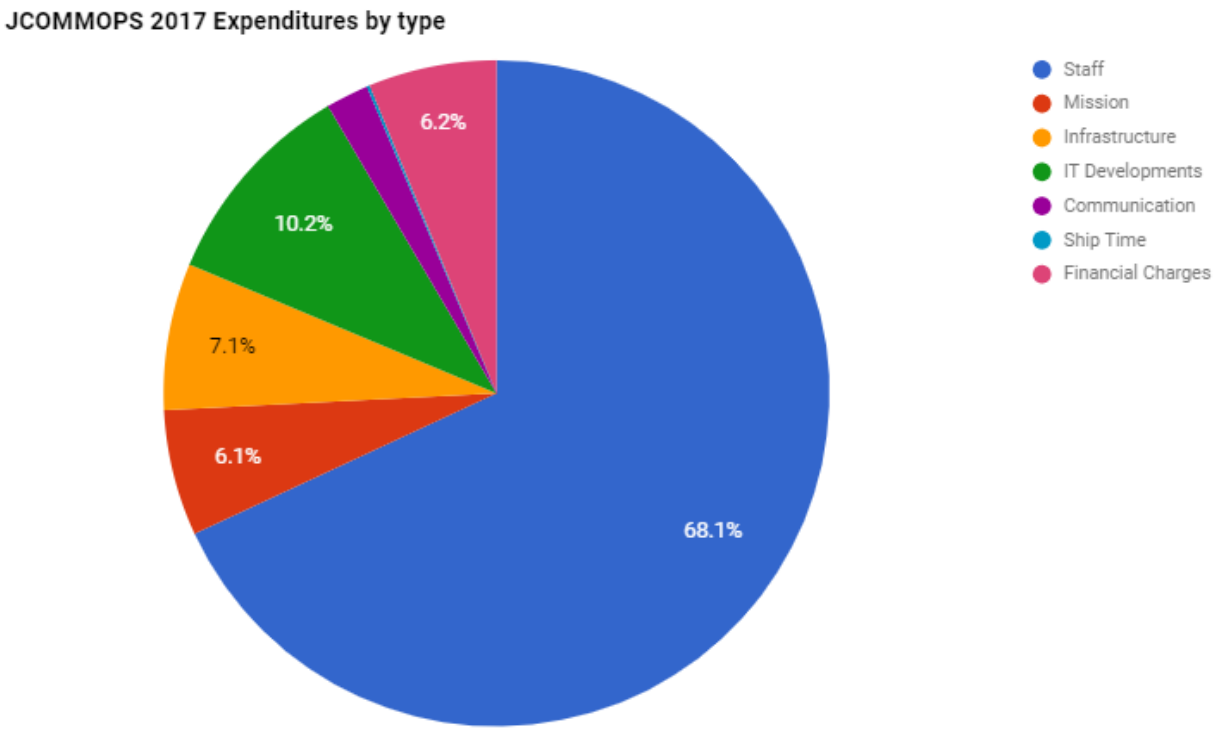

Figure 5: 2017 JCOMMOPS Expenditures

4.3.4 Integrated JCOMMOPS balance

The 2017 integrated JCOMMOPS balance is:

Tot.Contributions (908k$) – Tot. Expenditures (632k$) = 278k$
(This does not include a contribution from AtlantOS of 50k$ to be confirmed).

However taking into account the US double contribution (2017 and 2018) and the late arrival of some regular contributions, **the JCOMMOPS 2017 operating balance is close to -60K$.**

If we consider the integrated carry forward from previous year (537K$) and the 2017 integrated balance, **JCOMMOPS had 125 % of its operational budget ie ~800k$, in bank,** at the start of 2018**. (see Table 5).**

A number of issues have to be discussed related to finance that affect JCOMMOPS ability to deliver, one such is the appropriate level of funding to carry forward for the year start. Generally JCOMMOPS has set this level at 110% of total salary costs, i.e. 550K$, as the IOC and WMO Trust Fund rules require that all staff contracts are fully funded at the start of the financial year. JCOMMOPS would welcome a discussion

regarding the appropriate level of carry forward and the Trust Fund function, as there is some flexibility that is not currently exploited.

5. 2018-2019 Workplan and budget

Below are the major challenges and components of JCOMMOPS Workplan proposed for the next 18 months, beyond any funding consideration or details on routine activities. The expected time of resolution is indicated in quarter years. These activities should be reviewed and prioritized by OCG and the networks, and considered in parallel with the budget for the Workplan.

JCOMMOPS core or cross-network activity:

- Finalize the WIGOS compliant API (2019Q1)
- Develop the WMO/WIGOS id allocation operational procedure (2018Q4)
- Develop the web-help section (videos, tutorials, vocabulary documentation) (2018 Q3)
- produce the Report Cards and improve their web version (2018Q2, 2019Q2)
- Include emerging networks in JCOMMOPS monitoring system (2019 Q2)
- Strengthen the links between JCOMMOPS and OSMC data services (2018 Q3)

Network specific activity:

- improve DBCP MB metadata, website and monitoring tools (… - 2018 Q4)
- improve DBCP DB, historical HRSST sensors, misc. platforms (2019 Q4)
- Improve OceanSITES metadata and website for management, KPIs, and monitoring tools (… - 2019Q2)
- Improve SOT/VOS metadata and management, KPIs, and monitoring tools (2018Q4)
- Improve SOT/SOOP metadata and management, KPIs, and monitoring tools (2019Q4)
- Develop and improve the Argo data display 3D tools, and data access (2018Q3)
- Set and manage a GitHub for all Argo data formats decoders and exploit further Argo BGC index files (2018Q3)
- Exploit historical cruises metadata for GO-SHIP and develop further monitoring tools (2018 Q3)

- Gather R/V cruise plans (2018Q4 , and 2019Q4)

This proposed work plan, addresses the core of JCOMMOPS ToR and can be achieved with current staff members, provided the priorities are agreed.

To develop the Workplan budget 2018-2019 there are 3 issues already raised in this report that are relevant to consider:

- JCOMMOPS general operating budget (section 4.2) shows JCOMMOPS currently has an operating deficit of approximately 60K$ per year
- Some networks have a significant gap between funding provided and the staff TOR expenditure
- JCOMMOPS has some surplus at the start of 2018, but they are generally declining

Table 4 below shows the JCOMMOPS general operating budget with the distribution of work (expense) by network, as defined by the staff TORs. At the top of the table the regular contributions by network and for JCOMMOPS integrated can be seen, the expenses are tracked below (according to the staff TORs) and highlighted in orange is the total operating budget for JCOMMOPS in total, then by network. The yellow highlighted line below this shows the difference between funding and expense for the networks (as defined by the TORs) and below this (again yellow) the total annual deficit for JCOMMOPS (as seen previously).

In this table it is possible to see that some networks near fully fund the staff time given in the staff TORs, however several others do not fund to sufficient levels to support the staff TORs. In 2017 in addition to the difficulties caused by staff movements the lack of sufficient funding to support the staff TOR level of effort meant that JCOMMOPS integrated funding was used (at least in part) to support these gaps. This is a situation that cannot continue indefinitely and some alternatives are proposed below for discussion, however in principle there will need to be some adjustment in either future funding or operations so that the work distribution, some networks will need to increase their contribution to the level expected for the relevant level of staff support (TOR) or JCOMMOPS will need to adapt the work distribution to reflect contributions and the overall objectives of JCOMMOPS.

Item / US$	2018	Argo	DBCP	SOT	OceanSITES	GO-SHIP
CONTRIBUTIONS						
Networks Regular Contributions	454000	177000	112000	83000	51000	31000
JCOMMOPS Regular Contributions	126000					
TOTAL REGULAR CONTRIBUTIONS	580000	177000	112000	83000	51000	31000
EXPENSES						
TC Argo / JCOMMOPS Lead position	160,000	116800	11200	11200	11200	11200
TC DBCP / OceanSITES position	110,000	0	73700	0	36300	0
TC SOT/GO-SHIP/Cruises position	110,000	7700	7700	44000	7700	44000
I.T. Engineer position*	70,000	14000	14000	14000	14000	14000
TC Science Communication position	50,000	10000	10000	10000	10000	10000
TOTAL STAFF	500,000	148,500	116,600	79,200	79,200	79,200
TC Argo/JCOMMOPS travels	20,000	14600	1400	1400	1400	1400
TC DBCP/OceanSITES travels	20,000	0	13400	0	6600	0
TC SOT/GO-SHIP travels	15,000	1050	1050	6000	1050	6000
I.T. Engineer travels	5,000	1000	1000	1000	1000	1000
TC Science Communication travels	5,000	1000	1000	1000	1000	1000
TOTAL MISSION	65,000	17,650	17,850	9,400	11,050	9,400
I.T. Hosting (Cloud)*	30,000	6000	6000	6000	6000	6000
Activities (meetings, supplies)	5,000	2000	2000	2000	2000	2000
Office **	0					
TOTAL INFRASTRUCTURE	35,000	8,000	8,000	8,000	8,000	8,000
OVERHEAD	36,000	10,449	8,547	5,796	5,895	5,796
TOTAL OPERATIONAL BUDGET	636,000	184,599	150,997	102,396	104,145	102,396
BALANCE						
NETWORKS vs OPERATIONAL BUDGET	-182,000	-7,599	-38,997	-19,396	-53,145	-71,396
ALL CONTRIBUTIONS vs OPERATIONAL BUDGET	-56,000					

Table 4: JCOMMOPS, operational expenses and contributions, without consideration of any project items (see further developed Workplan Budget in Table 9 below)

Although the 2017 activities were not balanced with regard to some network contributions, adhering strictly to known anticipated funding levels in 2018 has the potential to paralyze integrated activity for JCOMMOPS and leave some networks with little scope for forward momentum in 2018. JCOMMOPS therefore proposes an interim solution for the 2018 Workplan budget (see below), where in the short term, the plan is made viable by distributing some of the JCOMMOPS integrated funding to support the underfunded networks. This is however an interim solution and longer term solutions need to be discussed by the networks, OCG and the Review Panel. JCOMMOPS has proposed a few potential solutions below.

JCOMMOPS Workplan Budget for 2018

JCOMMOPS proposes the budget below for discussion within OCG, the aim was to find a compromise while networks consider funding solutions and/or OCG decides we move to a more integrated funding model.

The solution proposed comes with a revision of IT engineer priorities so that there is progress towards a distribution of time that reflects funding, but at the same time do not freeze support for some networks and overall develops JCOMMOPS activities modestly.

There are 2 new contributions expected for 2018:

- extra 25,000$ provided by NOAA in support of JCOMM Report Card and OCG meeting (JCOMM/JCOMMOPS TF)
- TRUSTED project 20,000€ / year for 2018 (CLS/JCOMMOPS TF)

However, 170 k$ will be recovered by IOC in 2018 for reimbursement (DBCP TC salary taken on non JCOMMOPS funds).

The proposed budget for 2018 is given in the following (table 5), and consumes some of the existing surplus to leave an overall balance of 398k$ at the end of 2018. Some of the amounts provided have yet to be confirmed, however these are conservative estimates and so the funding level may increase but should not significantly decrease.

The expenses are also conservative.
Travel budget has been minimized and will match the reality.

This budget leaves however a some margin for discussion with Networks:

- 30 k$ of surplus on DBCP/JCOMMOPS TF allows to grow mission budget for the TC if needed, and to run a small project. On the first year of TC position, the budget generally needs to be slightly higher to meet as appropriate with implementers.
- One project is in the budget on CLS/JCOMMOPS TF (Web developments) and content should be agreed

The visibility on the US contribution in 2018 is also conservative and may increase.

Item / US$	JCOMM TF	DBCP TF	IOC TF	EXTRA IOC	CLS TF	2018 BUDGET
CARRY FORWARD 2016	154000	80000	268000	35000	0	537,000
BALANCE 2017	356000	-26000	-56000	50000	0	324,000
CONTRIBUTIONS 2018						
Networks Contributions (no US)	0	72000	57000	21000	40000	190000
Argo 2017 delayed contributions			30000			30000
JCOMMOPS Contributions (FR) (no US)					22000	22000
US Extra (Argo + Report Card/OCG)	120000					120000
EUMETSAT Project					25000	25000
TOTAL 2018 CONTRIBUTIONS	120000	72000	87000	21000	87000	387000
EXPENSES						
TC Argo / JCOMMOPS Lead position	160,000					160,000
TC DBCP / OceanSITES position	110,000					110,000
TC SOT/GO-SHIP/Cruises position	110,000					110,000
I.T. Engineer position		70,000				70,000
TC Science Communication position				50,000		50,000
TOTAL STAFF	380,000	70,000	0	50,000	0	500,000
TC Argo/JCOMMOPS travels			20,000			20,000
TC DBCP/OceanSITES travels		15,000				15,000
TC SOT/GO-SHIP travels		5,000				5,000
I.T. Engineer travels					5,000	5,000
TC Science Communication travels			0			0
TOTAL MISSION	0	20,000	20,000	0	5,000	45,000
I.T. Hosting (Cloud)	30,000					30,000
Activities (meetings, supplies)					5,000	5,000
TOTAL INFRASTRUCTURE	30,000	0	0	0	5,000	35,000
OVERHEAD (6%)	24,600	5,400	1,200	3,000	600	34,800
TOTAL OPERATIONAL BUDGET	434,600	95,400	21,200	53,000	10,600	614,800
Communication (Report Card) (done)					10,000	10,000
SOT Metadata/Website (done)					21,000	21,000
OceanSITES Metadata/Website (done)					13,000	13,000
Project#1 (TBD)					21,000	21,000
TOTAL DEVELOPMENTS / PROJECTS / OTHER	0	0	0	0	65,000	65,000
TOTAL EXPENDITURES	434,600	95,400	21,200	53,000	75,600	679,800
BALANCE						
2018 BALANCE	-314,600	-23,400	65,800	-32,000	11,400	-292,800
DEBT RESOLUTION IOC (DBCP TC SALARY) 1 off.			170,000			170,000
FINAL 2018 BALANCE	195,400	30,600	107,800	53,000	11,400	398,200

Table 5: JCOMMOPS proposed 2018 budget

For 2019, if nothing changes with regard to funding from Networks, JCOMMOPS will keep the same priorities and run a small project.
The modernization of the Report Card web version is certainly a project to prepare in 2018 (specifications) and consume in 2019. More options will be presented for OCG 10.

In addition the GOOS Project Office is proposing to allocate 0.2 FTE of one of his staff member (R. Pang) to work with JCOMMOPS. We need to discuss how best exploit this new resource skills, involved in the development of the GOOS Strategic Mapping, however given our challenges and workplan items, JCOMMOPS suggest a short term and medium term task:

- Assist to complete the metadata quality for the networks that need it urgently (Moored Buoys and OceanSITES).
- Improve the web linkage between JCOMMOPS and GOOS for the Strategic Mapping

In addition, **provided 2019 offers further funding possibilities**, JCOMMOPS could use a small fraction of its its budget to help the establishment of a new position to meet its medium term plans regarding expanding support to gliders/Regional Coordinator.

The budget does not currently include the WIGOS/OSCAR compliant metadata delivery together with WIGOS Ids allocation procedure, which will require at least 3 months exclusive work by the IT engineer. Although JCOMMOPS believes it is critical to achieve it is difficult to see how to do so, unless JCOMMOPS uses more of its reserves.

For 2018 - 2019 JCOMMOPS proposes this budget (2018) and work plan (intersessional period), which sees JCOMMOPS allocated funding being utilised to support specific networks, that have a shortfall between their funding level and resource requirements, and a couple of cross-network project using DBCP/JCOMMOPS and CLS/JCOMMOPS TF.

This is a short term solution to enable JCOMMOPS to fulfill its core aims and functions, JCOMMOPS however cannot continue to function in this way indefinitely. Firstly JCOMMOPS is running with an ongoing operational loss, secondly the the distribution of resource is not in line with funding and leaves JCOMMOPS providing a proportion its core funding to specific networks, which in turn leaves very limited resources available to move core development forward.

JCOMMOPS proposes the following potential models for future funding for discussion:

- JCOMMOPS develops some set levels of funding for an amount of resource identified as required by a network (e.g. 25% or 50% time of TC), these 'target' amounts are what the networks then achieve in terms of funding and receive in terms of support. JCOMMOPS allocated funding is used to move JCOMMOPS development forward through agreed projects.
- All funding received is utilised as JCOMMOPS integrated funding and allocated in line with the annually agreed Workplan, as approved by OCG and the networks.
- A % or set amount per year of networks funding goes to the central cross-network development projects, as agreed by OCG and the networks
- IOC (GOOS), WMO or other bodies with an integrated view find additional funding to support the development of integrated metadata services

Practically, how can we move forward to an alternative funding model/s?

Finally, JCOMMOPS also needs to see an increase in funding of order 15% to reach stability, at current levels of staffing and expenditure, and in order to open a new chapter in support of promising emerging

networks, and toward the completion of our perspective on the ocean observing systems complexity, giving gradually body to the GOOS.

6. Core Issues

1. Staff contracts vs. funds available in the fund accounts

Both the IOC and WMO fund rules prohibit staff contracts that have greater duration than the funding available. This means that JCOMMOPS is unable (in most cases) to offer contracts of greater than 1 year and if funding is delayed in the following year contracts may not be able to be renewed. This does not create stability of employment for JCOMMOPS staff and leads to gaps in coverage and loss of personnel.

In addition a reserve of a full year is needed to enable a contract of one year. There is no advance by organization.

Discussion: Is there any way for the WMO fund to be more flexible on this account, if assurances of funding are made (perhaps between the funds?), what level of funding should JCOMMOPS maintain for contract assurance?

2. Funding models

Today the integrated JCOMMOPS funding is enabling only small developments projects or adjustments as it is mostly consumed by the shortfall in network contributions vs TOR expectations. The capacity of JCOMMOPS to develop truly integrated projects is very limited. As outlined above it is important to discuss and consider the possible funding models for JCOMMOPS work, both integrated and network specific.

Discussion: Are we ready to move towards new models?

3. Staff:

Although staff turnover is natural in the professional world, there are two issues related to JCOMMOPS that make this issue more difficult. Staff contracts are generally only for 1 year (due to the function of the trust funds - it is difficult to have 2 years salary available) and with some uncertainty about renewal (availability of full years salary) leads to staff turnover. A slow recruitment process when staff are lost has led to positions being left empty for months, which has an impact on both the core and regular activities, metadata quality slowly decays and generates gaps that have eventually to be addressed. JCOMMOPS is aware that this is generating some frustration with the networks, however the function of the Trust Funds creates problems in terms of stability of the staff.

Discussion: Are there solutions that could be proposed to ease the issues around staff contracts and regular funding?

7. Recommendations

1) Adopt the workplan, with priorities and check the status of these 15 items at next OCG. Provide further workplan items if needed.

2) Develop KPIs to track JCOMMOPS progress on metadata quality for all networks.

3) Review Panel and OCG to comment on the objectives

4) Review Panel and OCG to comment on the potential funding models for the future, and the overall prioritization of the activities between network specific and integrated.

5) Without overestimating the requirements we can say that JCOMMOPS needs about 100k$ / year to balance its operational budget at existing staffing levels (i.e. a 15% budget increase is critical). Networks, OCG, and Review Panel to propose solutions.

6) Develop a multi-partner MoU or Agreement to define the status of the relationships between JCOMMOPS and its supporting partners as a joint and decentralized office of IOC/UNESCO and WMO, with France and/or Ifremer as host.

7) Re-establish the contact with regional and national authorities to raise further support and funding. Negotiate with French authorities with regard to status of JCOMMOPS with WMO.

8) Invest appropriately in I.T. human resources to: maintain uninterrupted the operational Information System, for regular and new I.T. developments (direct or through short term ad hoc contracts) and to plan a major revamp of the Information System, say on a 10-year cycle, to keep up with evolving technology

9) Realize a feasibility/cost-benefit study for the move of the I.T. infrastructure to Brest.

10) Find ways to stabilize the work contracts for the staff members to avoid turnover and build on experience.

11) JCOMMOPS urges steps to be taken to assure continuity of staff, and minimize the gaps (e.g. by recruiting temporary staff), can the trust fund issues be eased or JCOMMOPS will need to carry a large surplus?

12) Currently there is no written governance on the funds in CLS account. This needs to be clarified and documented.

13) New networks to raise funding to set a new position in 2019 and enable further support. Develop ToR for that new position.

14) Secretariats to work with JCOMMOPS to find regional pilot through e.g. a Circular Letter.

APPENDIX

A1. JCOMMOPS ToR

Annex 1 to draft Recommendation 6 (JCOMM-5)

NEW TERMS OF REFERENCE OF THE JCOMM IN SITU OBSERVATIONS PROGRAMME SUPPORT CENTRE (JCOMMOPS)

Under the overall guidance of the JCOMM Observations Coordination Group (OCG) and following the direction of

- The Data Buoy Cooperation Panel,
- The Ship Observations Team,
- The Argo Steering Team,
- The OceanSITES Science Team,
- The Global Sea Level Observing System Group of Experts,
- The Global Ocean Ship-based Hydrographic Investigations Programme Committee,
- The OceanGliders Steering Team,
- Other ocean observing network steering bodies coordinated by the JCOMM OCG (e.g. animal borne instruments, global high frequency radar network, polar and other regional/coastal observing systems), and

Under the lead administrative supervision of the WMO Secretariat consulting with the IOC of UNESCO Secretariat, and executing the Work Plan provided by the OCG and relevant panels, and associated programmes,

The JCOMM in situ Observations Programme Support Centre (JCOMMOPS) shall support the implementation of an integrated framework for the ocean observing networks as promoted by the OCG.

Under the currently established "vision", JCOMMOPS will undertake 1) assistance for implementation/deployment; 2) mechanisms for exchange of data/metadata; 3) develop observation system monitoring tools.

Specifically,

1. Implementation/deployment:

(a) Act as a focal point and assist in implementation, deployment and coordination of the oceanographic and marine meteorological observing networks by clarifying and assisting in resolving technical issues between platform operators, data centres, manufacturers and satellite data telecommunication providers;

(b) Assist in demonstrating the scientific value of global ocean observing programmes in support of WMO and UNESCO/IOC Programmes and co-sponsored Programmes by compiling materials and assisting ocean observation science teams as appropriate;

(c) Maintain an operational awareness, and where feasible, share observing platform deployment planning and servicing opportunities and operator contact information, to maximize deployment opportunities and sharing of resources;

(d) Encourage cooperation to develop synergies between relevant actors and to promote the observing system/networks;

(e) Contribute towards capacity development, educational and outreach initiatives fostering the participation of Members/Members States in the implementation of marine/ocean observing networks;

(f) Implement and maintain the observing platform deployment notification procedures required by IOC Resolutions XX-6 and EC-XLI.4

2. Support consistency and mechanisms for exchange of data/metadata:

(a) To assist in instrument and data management standardization through supporting the collection and distribution of information on current and best practices from OCG networks, and monitoring information in metadata;

(b) Facilitate free and unrestricted data and metadata exchange in real time, by providing appropriate technical assistance to platform operators, and serving as a collection and distribution point for selected platform/instrument metadata and as a source of information on other metadata and data distribution services;

(c) Promote integrated access to data and metadata through close cooperation with the US NOAA Observing System Monitoring Centre and the JCOMM Data Management Programme Area;

(d) Promote the flow of data and metadata to archiving centres, and facilitate routine provision of WMO Integrated Global Observing System (WIGOS) metadata to the Observing System Capability Analysis and Review tool (OSCAR);

(e) Allocate unique identifiers to all observing platforms registered at JCOMMOPS, including in particular when delegated authority to issue WIGOS identifiers on behalf of WMO Members;

3. Develop observation system monitoring tools:

(a) Routinely collect and distribute information on: (i) the performance of the observing system networks relative to targets, (ii) attributes of platform, instrumentation, and telecommunication systems, and (iii) functional status of and data quality from individual observing platforms;

(b) Develop a consistent set of tools needed to monitor the status of the observing system and its attendant data and metadata distribution, so as to identify areas to improve the overall transparency, effectiveness and development of the system;

(c) Develop and maintain performance measures for each observing network and provide an integrated perspective. Publish regularly a "JCOMM Observations Report Card" to inform as appropriate Member/Member States on the status and benefits of the observing system.

A2. Note on metadata management

JCOMMOPS recalls first what means the word "Metadata" in its perspective, as it is the key information used to meet its challenges and assist networks as appropriate.
The aim is not to capture everything, especially if networks have developed their own metadata flow, but to capture a common denominator enabling an integrated view and including these categories:

- Unique identifier, label (registration/certification process, the future WIGOS ID) => interoperability key
- Implementer (programmes, contacts, funding sources) => structuration of the components
- Operations at sea (ships/cruises) => one of the critical links between the system elements
- Hardware: vocabulary to describe and regroup the "platforms" => performance, market
- Sensors: vocabulary => path to EOV/ECV and market view
- Telecommunications => to oversee data distribution, additional tracking source. check market evolution
- Observations: available in RT or DM => the user perspective to be optimized.
- Essential parameters as identified by the WIGOS metadata standard

Currently JCOMMOPS evaluate the quality of its metadata management as follow, and will develop an indicator to track this progress on a monthly basis:

Network	Metadata quality poor (*), average (**), appropriate (***), very good metadata (****)
Argo	****
DBCP/DB	***
DBCP/MB	**
SOT/VOS	**
OceanSITES	**
DBCP/Misc.	*
SOT/SOOP	*
GO-SHIP	*
R/V cruises	*
GLOSS, OceanGliders, HF Radars, Animals, ALAMOs, ITPs ...	*

***Table 1**: Quality of JCOMMOPS metadata in key categories for each network (to become a KPI and be tracked monthly)*. As an example a 4 stars metadata set will include historical records with unique identifiers, operational records, deployment or cruise plans, ship/cruises operations information , sensors , and observations available to users (RT/DM).

The conditions to succeed in developing such quality service includes:
- a "certification" process led generally by the Technical Coordinator at JCOMMOPS, and helped by a set of checking tools

- an active involvement of the implementers to provide the required information
- an active involvement of JCOMMOPS with network Data Teams to develop standards

The quality has a price. As good as can be the web based monitoring tools, there is a routine labour intensive task to perform regularly, to track networks development.

JCOMMOPS controls and improves the quality of the backbone of metadata and participate actively in defining the content and vocabulary with Data Teams and experts, with the aim to build the convergence of research and operational code tables in place or being developed.

The allocation by JCOMMOPS of unique identifiers (WIGOS Ids) to all elements will help this certification process.

The submission of this metadata backbone to WIGOS, when successfully achieved, will demonstrate the integration is reached. It will be useful far beyond WMO requirements and will ensure a common language between the systems to enable a large interoperability.

A3. Details on 2017 staff time by network:

- JCOMMOPS Lead was actively involved in Data and Steering Teams (for OceanSITES and SOT in particular) to help the metadata work to take off, absorb position gaps, train and guide new staff, and guide related I.T. developments. With build up experience and the developed monitoring tools for Argo, Mr Belbéoch substantially increased his productivity as Argo TC, allowing him to provide support to JCOMMOPS synergetic issues and to partly fill the gap for the other networks.

- Under JCOMMOPS Lead guidance, the I.T engineer has been following the identified I.T. priorities and did some metadata work (normally reserved to TCs) to absorb gaps, and make progress where needed.

- The DBCP/OceanSites TC L. Jiang was recruited as of November 2017 after the position being vacant for about one year. While the incumbent was initially based in Geneva, he spent a week in Brest to learn and start the team work. However, working remotely from Geneva does not facilitate the daily teamwork.

- The Ship Coordinator M. Kramp is on extended leave without pay since August 2017 for 11 months. Ms Magali Krieger was recruited from September 2017 to February 2018 to fill the gap. M. Kramp will be back at the office on July 9th 2018 and will spend a few days together with M. Krieger for knowledge transfer.

- The Science and Communications Coordinator (Emanuela Rusciano) has been supporting every program equally through JCOMMOPS truly integrated activities.

- Thomas Latter (former internship at JCOMMOPS) had worked a full year for JCOMMOPS relieving the workload on the I.T. engineer and boosting web development productivity.

It is very important to understand that the introduction of a new staff in the small team, even temporarily, is releasing space to address some priorities for the common interest.
T. Latter has an extremely high productivity for JCOMMOPS web developments and a knowledge of our requirements and network specificities. Such experience is long to acquire. Without this variable of adjustment, and considering JCOMMOPS was understaffed in 2017, the centre activities would have been suffering much more.
Early 2018 it was decided not to renew the (sub)contract for the Web Developer T. Latter, and consequently A. Lizé had to take over the web development part, and could therefore not be able to assist the TCs as much as needed.