Format Guide for DARPA Status Reports

Many CEROS contracts require DARPA Status Reports to be submitted at 6-month intervals after the start of the contract. A 12-month contract that is completed within the term of the contract will have a DARPA Status Report due at the 6 and 12 month milestones; a project that is extended beyond the 12-month period may need to submit additional Status Reports at 6-month intervals.

The Status Reports are used by DARPA Program Managers to inform senior DARPA management about the progress of their projects; they are incorporated into the internal DARPA Weekly Activity Reports (termed WARs). DARPA WARs may in turn be distributed to higher management within and beyond the Department of Defense.

Format guidelines and a template provided by DARPA are given below, followed by examples of Status Reports.

PREPARATION GUIDELINES

- FONT – Use only Times New Roman 12
- MARGINS – 1 inch all around
- Text should be single-spaced
- No automatic spacing before or after paragraphs.
- Use left alignment
- Don't use headers or footers
- TWO SPACES AFTER PERIODS PLEASE! Note that Word does not do this automatically if you move text around. Please double-check this before submitting!
- ***DO NOT EMBED GRAPHICS IN YOUR ITEM!***
    - Graphics should be submitted as a single separate file.
    - Limit your graphics to those graphics that add significant informational value to your item.
    - Do not submit graphics that total more than 3 Mb file size.
    - Compress all graphics to web/screen resolution to decrease size
    - Submission of jpg files is preferred, if possible, again to keep the file size down.
- In the text of your item, do not refer to images above, to the right, etc. – in order to put all office items into one document, we have to adjust image locations. Better to give the image a self-explanatory caption that doesn't need a reference in the text itself, or label the image as figure 1, 2, 3, etc., and in the text, refer to the figures by number.
- **Try to keep the length to less than two pages, with fewer than two images.**
- Don't include the name of your contractor, PI or the office name in the summary. Just talk about the technical achievement.

- *Always* write out an abbreviation before you use it for the first time – include the abbreviation in parentheses after the written-out term.
    - However, only include the abbreviation in parentheses if you actually use the abbreviation later in the document. Do not include the abbreviation if you don't ever use it again – in that case, just use the written-out term.
- Just because you're using an abbreviation does not necessarily mean that the words of the corresponding term also are capitalized. **Only capitalize the initial letters of the words in the related term if they are proper nouns.** Use lowercase for the words if the term is a common noun. For example:
    - tactics, techniques, and procedures (TTP)
    - The message needs to be sent to each fleet intelligence center (FIC).
    - The message needs to be sent to Fleet Intelligence Center, Pacific (FICPAC)
    - complementary metal oxide semiconductor (CMOS)
- When an abbreviation ends in an uppercase letter, the plural is formed by adding just a lowercase *s*; do not add an apostrophe.

Nouns/Adjectives

Spell out *United States* and other country names when used as pronouns, but use their abbreviations (when applicable) as adjectives. Abbreviations are acceptable in figures and tables.

- . . . agreements between the United States and the United Kingdom will be . . . .
- . . . the U.S., U.K., and French representatives will be . . . .

Plurals

Most abbreviations are established in the singular form. Therefore, attention must be paid to whether the term is singular or plural. When an abbreviation ends in an uppercase letter, the plural is formed by adding a lowercase *s*; no apostrophe is used.

- The USDs will sign the memorandum at the briefing.
- The current unmanned combat air vehicle (UCAV) effort is . . . . all UCAVs are . . . .

In addition to units of measurement, some abbreviations represent words or phrases that are already plural. For example an *s* is not added to the following plural abbreviations:

- CONOPS = concept[s] of operations
- EEI = essential elements of information
- ROE = rules of engagement
- SOF =special operation forces
- TTO = tactics, techniques, and procedures

State Names

The names of states, territories, and possessions of the United Sates are spelled out in text. Use the two-letter USPS abbreviation in mailing addresses (inside and outside). Two-letter state abbreviations are acceptable in figures and tables.

Acronym Guidelines

Acronyms are abbreviations that are pronounced as words (for example, DARPA).
All acronyms are abbreviations, but not all abbreviations are acronyms (for example, CIA, DoD, and FBI).

Include the abbreviation in parentheses (or brackets within parentheses) after a term first appears, *but only if it is used more than once in the document*.

- the Department of Defense (DoD)
- (e.g., the Defense Intelligence Agency [DIA] and National Security Agency [NSA])
- the Command, Control, Communications, Computers, and Intelligence (C4I) for the Warrior (C4IFTW) program

Generally, do not use articles before abbreviations ("DoD" and "DARPA"; *not* "the DoD" or "the DARPA").

TEMPLATE AND GENERIC EXAMPLE

SUMMARY

Summarize your item here. The summary should be easy for a lay person to understand, and should capture the significance of your item – it needs to answer the "so what" question – why do we care, and how will the achievement impact DoD. Summary should be a **single short paragraph – example follows – note how short the paragraph is -** Creatv MicroTech, Inc. has demonstrated a portable Integrating Waveguide Biosensor instrument for detecting the presence of one of four deadly serotypes of the botulism neurotoxins in fewer than three hours. This compares very favorably to the current, less specific procedure that requires four days in a laboratory.

DETAILS

Start the details of your item here. Clostridium BoNTs are among the most poisonous substances known; they are extremely toxic, even in minute amounts. Four serotypes A, B, E and F cause human illness. One gram of pure BoNT serotype A could potentially kill one million people, depending on the mode of entry. BoNT/A is toxic to people because it cleaves an important peptide (amino acid chain), named SNAP-25, in neural synapses and can quickly cause death through "soft" paralysis by blocking neuro-transmission.

The only current method used with confidence to detect BoNT is the mouse bioassay which has a number of drawbacks: (1) this procedure has a high cost; (2) it requires a large number of animals; (3) it takes four days to complete; and, (4) it can lead to false positive results.
Creatv MicroTech, Inc. of Potomac, MD has demonstrated two novel assays using their "Integrating Waveguide Biosensor" instrument that can detect BoNT serotype A and confirm its activity in very low concentration in three hours.

The “Integrating Waveguide Biosensor” instrument, developed and patented by the Naval Research Laboratory (NRL), uses a glass capillary waveguide with antibodies on the inside surface of this tube to capture the fluorescent ends of SNAP-25-based antibodies tagged with a fluorescent dye molecule to detect the presence of BoNT/A molecules in analytes introduced into the tube, a laser to produce fluorescence of these antibodies, and an optical detector to collect and integrate the fluorescence. The comparison of the light collected from captured cleaved detector antibodies after washing non-cleaved antibodies from the tube to the light collected before washing is used to measure the ratio of active vs. inactive BoTN/A molecules.
Creatv has made improvements to this instrument to increase the sensitivity and accuracy and decrease the time required for analysis. These include: (1) introducing BoNT captured on magnetic beads, (2) modification of the SNAP-25-based antibodies, and (3) optimizing the concentration of the peptide substrate. In performing this research, Creatv has received advice from collaborators at the US Army Medical Research Institute for Infectious Diseases.

In the next phase of this project, Creatv proposes to: (1) develop methods to optimize and further improve the speed and sensitivity of the assays; (2) develop and demonstrate a surface sampling method to determine active and inactive toxin; (3) develop a transportable instrument; and, (4) develop an automated assay not requiring highly trained personnel.

In follow on efforts, this process could be expanded to include the other three disease causing BoNT serotypes: B, E and F.

CEROS EXAMPLE 1

USE OF HYDROACOUSTIC SIGNALS FOR ENHANCED TSUNAMI WARNING

SUMMARY

An analytical procedure was developed and implemented to improve the reliability of tsunami warnings. The objective was to reduce the time, and therefore the economic and social impacts, spent under false tsunami warnings and watches, but without negatively affecting the warning of actual damaging tsunamis. The concept involves the use of hydroacoustic signals from an existing network of hydrophones to determine the duration, spatial extent, and source depth of the tsunamigenic earthquake. The analytical tool was developed by Science Applications International Corporation and has been deployed for testing and use on operational computing systems at the NOAA Pacific Tsunami Warning Center (PTWC) in Ewa Beach, Hawaii.

DETAILS

Destructive tsunamis cause widespread damage and loss of life, most often in the Indo-Pacific region They occur sporadically and unpredictably, but with a frequency measured in one event per few years. The U. S. military is impacted by tsunamis in two ways. First, any near-shore operation would be impacted should a tsunami occur, and second, the U. S. military often plays a major role in relief efforts, as PACOM did in the 2004 Indonesia tsunami, the most destructive ever recorded. Improving our ability to accurately predict the impact of a tsunami provides not only direct benefit to the communities involved, but also aids military relief activities and serves to improve geopolitical stability and cooperation.

Tsunamis are generated most often by direct displacement of the seafloor that results from large earthquakes occurring at crustal plate boundaries along oceanic margins. The lateral extent and depth of the fault rupture are major determinants in whether an earthquake is tsunamigenic or non-tsunamigenic (shown diagrammatically in Figure 1). The fault rupture also generates T-phase hydroacoustic signals, which is seismic energy that is trapped as sound in the SOFAR channel. Sound in the water travels several times faster than the tsunami wave itself, and can have early predictive value for tsunami size and impact.

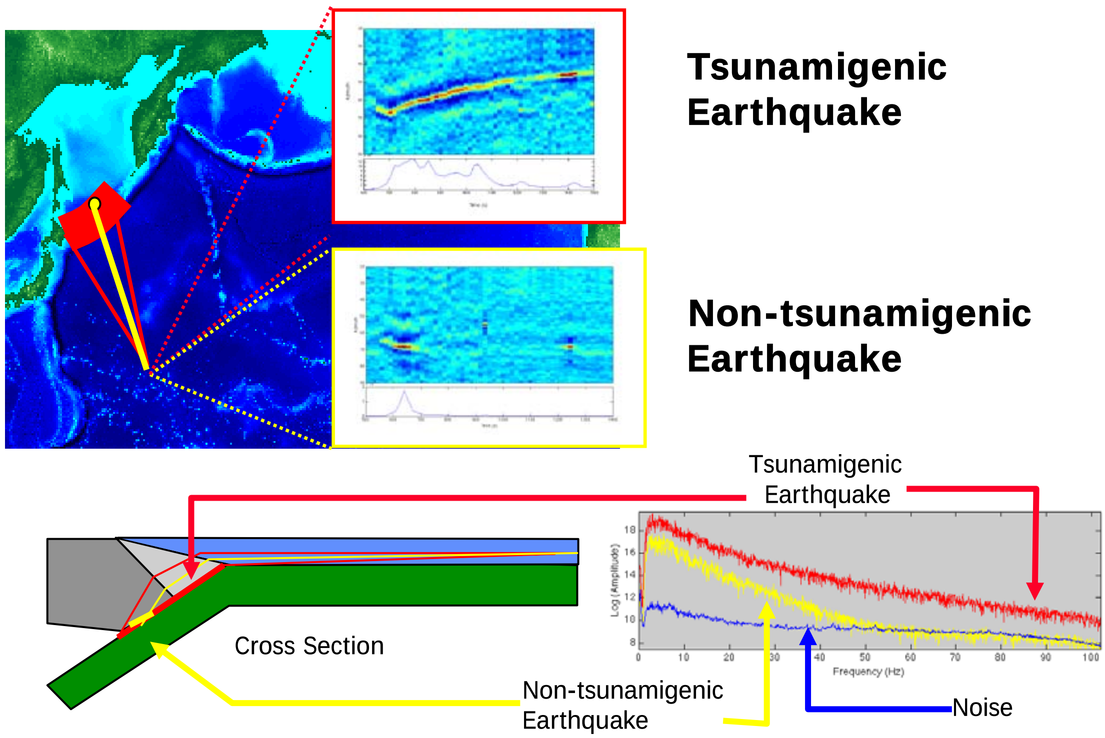

Figure 1. Shallow and extensive fault ruptures (red) are more likely to create tsunamis than are small and deep fault movements (yellow). The shapes of the corresponding T-phase spectra (lower right) are used to determine the potential affects of a tsunami.

This project used data from International Monitoring System hydroacoustic stations, operated by the CTBT. Several terabytes of continuous acoustic data was process to identify T-phases. The identified T-phases were then cross-referenced with larger earthquakes (magnitude 5.5 and greater).   From that, a dataset of T-phases from 378 earthquakes was collected and analyzed. It was determined that the source duration and source extent were of limited predictive value, but that the spectral slope of the T-phase signals were indicative of tsunamigenic potential. The algorithms were refined to model the slope of the signal spectrum as both (1) linear across the spectrum, and (2) as a combination of two lines over the spectrum. Using the minimum value of either the one- or two-slope model, a Moment Magnitude T-wave spectra correction term (Mwts) was derived. The correction term Mwts was found to relate to the tsunami potential of the earthquake, based on hindcasting of historical data from earthquakes originating in mainland Alaska, the Aleutian Islands, and the Indian Ocean.

The algorithms developed in this project, along with a GUI interface for operator control and display, were transitioned to an operational system receiving the real-time hydroacoustic data input at the PTWC, where the tools are presently being used and evaluated by NOAA geophysicists and oceanographers.

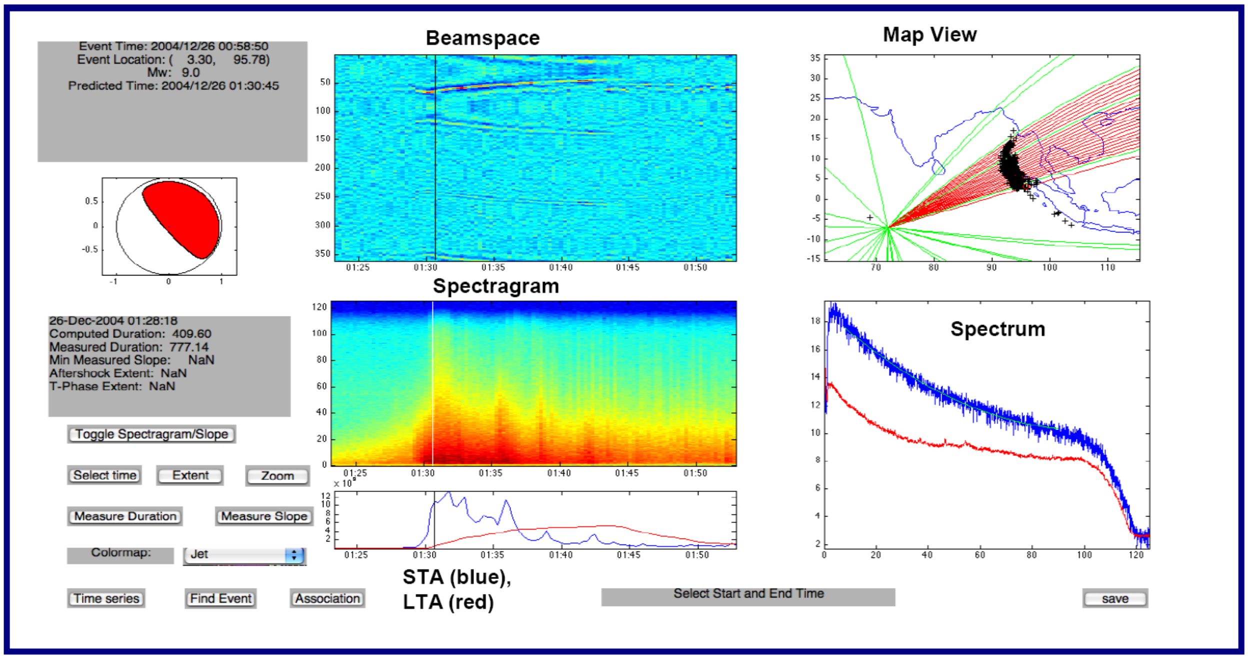

Figure 2. Algorithm output for the Indonesian tsunami event of 24 December 2004. The upper left part provides information about the source event, and the buttons in the lower left control function used in the analysis. The center and right-hand panels show analytical results in the form of spectrograms, T-phase spectra, and map vies of probable event origin.

CEROS EXAMPLE 2

POLYMER GEL FOR MARITIME MAINTENANCE DEVELOPED

SUMMARY

DARPA researchers have developed and tested a specially formulated polymer hydrogel as a means of cleaning vessel surfaces of oil and grease, particulates, and soluble compounds during shipyard maintenance, reducing both labor hours and contaminated waste for vessel resurfacing procedures. Work was done in collaboration with the Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility, which provided guidance on acceptable chemical formulations, waste acceptance criteria, bench and field-testing of application methodology, and performance evaluation.

DETAIL

DARPA researchers have developed and tested a specially formulated polymer hydrogel as a means of cleaning vessel surfaces of oil and grease, particulates, and soluble compounds during shipyard maintenance, reducing both labor hours and contaminated waste for vessel resurfacing procedures. Work was done in collaboration with the Pearl Harbor Naval Shipyard (PHNSY) and Intermediate Maintenance Facility, which provided guidance on acceptable chemical formulations, waste acceptance criteria, bench and field-testing of application methodology, and performance evaluation.

PHNSY is charged with fleet maintenance, and currently uses the Society of Protective Coatings SP-1 standard methodology to clean and prepare painted and rusted metal prior to sand or needle blasting. In the absence of pre-cleaning, it has been found that the force of blasting can impregnate oil and grease into the surface roughness of blasted metal and result in early paint adhesion failure. SP-1 is a standard method for removing visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces. Cleaning and stripping is a labor-intensive and inefficient process that produces substantial quantities of waste products.

Cellular Bio-Engineering, Inc., in collaboration with PHNSY staff, and funded under the National Defense Center of Excellence for Research in Ocean Sciences, developed and tested a decontamination method that equaled or exceeded the efficacy of SP-1, using sprayable or brushed-on liquid gels that encapsulate contaminants into a polymer gel that dries to a tough film that can then be peeled off from a wide variety of surfaces and then easily and safely disposed of.

Nearly 300 gel formulations were prepared and tested. Two formulations were selected that most efficiently removed residual oil and grease contamination from painted and unpainted surfaces. One formulation is a brush-on or trowel-on liquid gel. The other can be applied with an industrial sprayer. Both products draw in and incorporate oil and grease contaminants into a polymer matrix that dries to a tough film. The resultant film can then be peeled away and disposed of using the same waste disposal criteria required for the contaminants removed. The result is a clean and ready surface that meets or exceeds SP-1 criteria for subsequent paint removal with a significant reduction in labor hours, materials, and waste disposal compared to current SP-1 methods.

Both sprayable and non-sprayable optimized formulations demonstrated improved or statistically equivalent oil and grease decontamination compared to the current PHNSY cleaning method, SP-1 on both horizontal and vertical surfaces. Cost analyses by PHNSY demonstrated cost savings ranging from 33 to 51 percent for both complex and open surfaces compared with SP-1 using detergent solutions or solvents. PHNSY was supplied with several gallons of both products for further testing and evaluation. Product commercialization is anticipated for both military and commercial applications.

Figure 1. Use of polymer hydrogel for surface decontamination in ships. (upper left) Application with brush, (upper right) dried film in place, (lower left) peeling of dried film, and (lower right) sheet of dried film incorporating surface contaminants.