

## 1 PURPOSE

Ground Transportation systems, such as highways, busses, transit, rail and marine are a subset of the infrastructure industry sector. Large procurement efforts reflect this reality. The Infrastructure industry segment is an emerging Systems Engineering practice area, dominated by civil engineering and architecture firms. The system lifecycle for ground transportation projects is 25 to 100 years and often involves public trust and funding.

The Transportation Working Group (TWG) seeks to advocate for and facilitate a continuous improvement of planning and engineering decisions made within the Ground Transportation sector over the entire system lifecycle.

### INCOSE Vision 2025 Imperatives mapped to TWG Objectives:

<i>TWG Objectives</i>	<i>INCOSE Vision 2025 Imperatives</i>
A, B, C, D, E, F	Expanding the application of systems engineering across industry domains
D, E, F	Embracing and learning from the diversity of systems engineering approaches
A, B, C, D, E	Applying systems engineering to help shape policy related to social and natural systems
H	Expanding the theoretical foundation for systems engineering
C	Advancing the tools and methods to address complexity
A,G	Enhancing education and training to grow the systems engineering workforce

## 2 MISSION, VISION AND GOALS

### 2.1 VISION

Ensure that Policy Makers, Transportation Agency Executives, Suppliers and Consultants understand the holistic, long-term nature of plans and decisions made, which will affect the movement of people and goods for more than 25 years from the decision point.

Proactively shape and guide the ground transportation procurement process using the processes, skills and abilities found with the Systems Engineering community.

### 2.2 MISSION

Deliver 21st Century Transportation Systems that providers and users need through the pragmatic application of Systems Engineering practice on three levels:

- Executive - Shaping Transportation Policy and Public Sentiment
- System - Improving Transportation System Acquisitions
- Operational - Better informed Transportation System Plans and Operations

### 2.3 GOALS & OBJECTIVES

- Promote and develop a community of competent Transportation SE Practitioners
- Develop papers to be presented during International Symposia and Workshops
- Develop work products facilitating SE practice tailored for Ground Transportation
- Maintain interest in SE practice through regular, periodic presentations and meetings
- Establish working relations with other professional organizations such as APTA or AREMA
- Propagate SE practice throughout disparate stakeholder groups, such as procurement
- Support and encourage the entry of student and recently graduated engineers
- Coordinate Efforts with educational institutions for research projects and internships.

## 3 SCOPE

Based on the approach of current industry procurement practices, Ground Transportation is effectively a subsidiary sector of Infrastructure in many large transportation projects and programs. Transit and Rail contracts are invariably led by a civil and architectural engineering firm which then subcontracts specialty engineering services related to the actual transportation mode.

The Transportation Working group was formed to promote the application of systems thinking, systems awareness and holistic engineering within the ground transportation industry sector including;

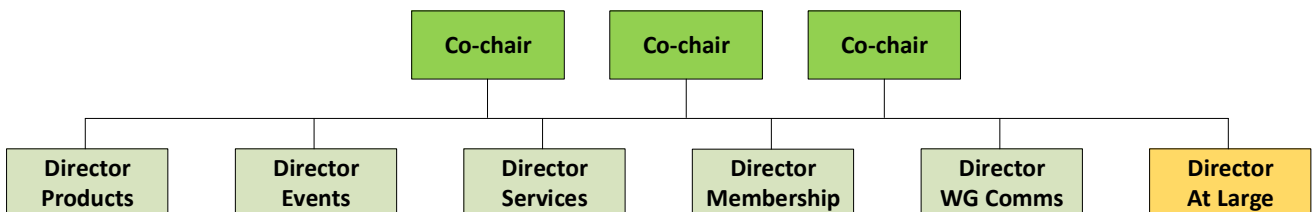
- Ground-based people and goods conveyance systems (moving sidewalks)
- Vertical conveyance systems (Elevators & Escalators)
- Heavy Rail (Passenger and Freight)
- Bus, Bus Rapid Transit
- Transit and Light Rail
- People-Movers, Trams, Monorails
- Roads and Highway systems
- Marine Transport Systems
- Ride share systems
- Related supporting technical and business organizations
- Related Governance and legislative organizations
- Related Educational organizations

## 4 SKILLS AND EXPERTISE REQUIRED

The TWG has identified and organized around five key functional areas, not including leadership;

1. Products (Newsletter, Standards, Papers, Guides, Presentations, Case Study Library)
2. Events (IS, IW and Webinars)
3. Services (Website, LinkedIn)
4. Membership (Outreach, Contact Management)
5. WG Communications (Intra-INCOSE WG coordination/cooperation such as IWG, AWG )

### *INCOSE TWG – Key Functionality*

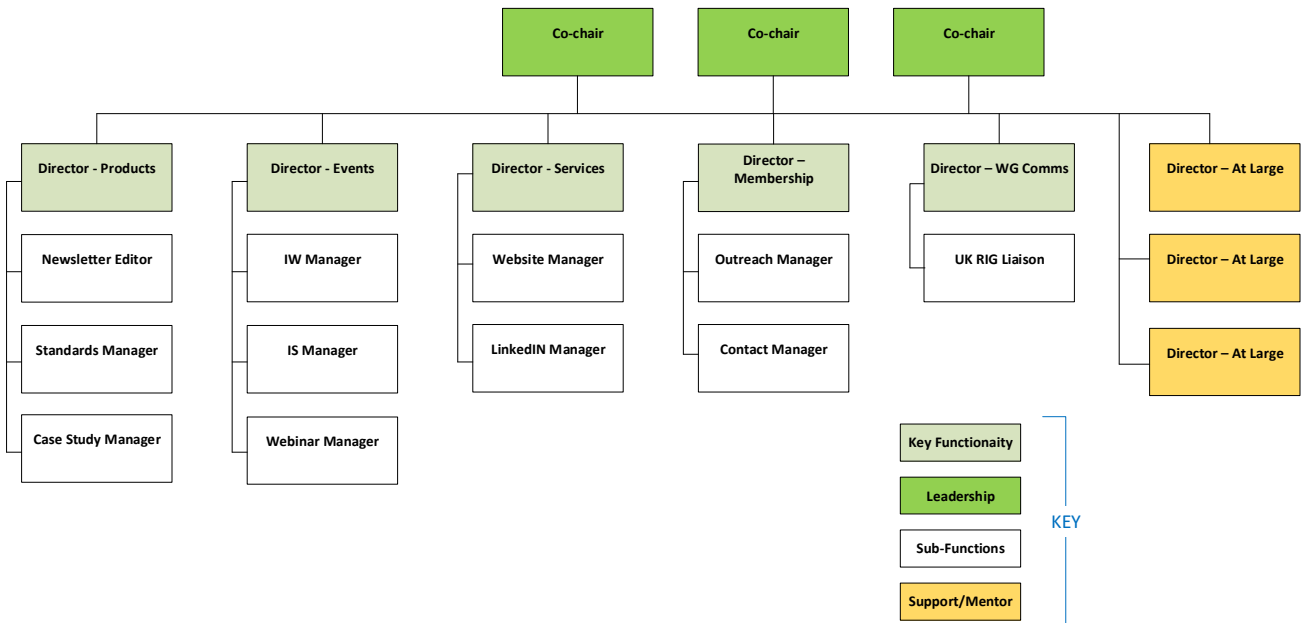


Three Co-Chairs provide the needed redundant coverage in a volunteer organization. The 'At-Large' positions provide opportunities for mentorship by former leaders and allow for succession planning within the TWG.

The full organizational Chart is provided in the figure below showing the required subfunctions. Detailed descriptions of roles and responsibilities is provided in the accompanying TWG Operations Manual [TWG-INCOSE-Ops\_Man\_006.PDF].

## INCOSE Transportation Working Group

Version 18 Nov 13, 2019



Directors are expected to cover Functional Manager role activities in the case of a missing sub-function volunteer. Updated names for each volunteer are provided in the accompanying TWG Organizational Chart document [TWG-INCOSE-Org\_Chart\_rev.PDF] and [TWG-INCOSE-Org\_Roles\_rev.PDF] where rev = current revision.

## 5 OUTCOMES (PRODUCTS/SERVICES)

The intended deliverables (products/services) that will be produced by the TWG are highlighted in the TWG Organization Chart. Details applicable to these deliverables are described in the accompanying TWG Operations Manual [TWG-INCOSE-Ops\_Man\_rev.PDF] where rev = current revision.

Examples of the expected TWG deliverables are; TWG Newsletter, Transportation Standards, Papers, Industry SE Guides, Presentations, Roundtable Reports, TWG Case Study Library, TWG Website and facilitated discussion threads within the TWG LinkedIn Site. The planning and execution of these deliverables will vary with the level of volunteer support available each year.

### 6 APPROACH

The approach to operations of the Transportation Working Group is detailed in the accompanying TWG Operations Manual [TWG-INCOSE-Ops\_Man\_006.PDF]. The Operations Manual provides details on;

- Meeting frequency
- Event Planning & Support
- Administrative activities
- Accountability, Roles and Responsibilities
- Communications (External, INCOSE WGs & Internal)
- SWOT analysis for the working group
- Strategic Planning

#### 6.1 BRANDING

The following Logo has been developed and is used with TWG stickers and TWG work products:



This TWG logo was developed using the Official Logo file [INCOSE logo\_2016.png] currently posted on the INCOSE primary website.

### 6.2 BYLAWS

#### A) ELECTION OF LEADERSHIP

Election of Co-Chairs shall generally occur at the INCOSE International Workshop during the TWG Annual Meeting. Co-Chairs shall be elected by a majority of working group voting members who are present and voting. Newly elected co-Chairs shall assume office at the conclusion of the meeting at which they are elected. Term limits of 3 years for each Co-Chair are recommended, but not mandatory, due to the dependence and varying availability of volunteers.

#### B) VOTING

In order to maximize participation in any vote, the TWG shall enable remote members to vote so long as they are recorded as present for the meeting. Voting members who are remote shall be recognized by conference call or other electronic technology. Voting members who are remote shall be recorded as "remote" in the attendance log for the meeting along with voting members who are physically attendant at the meeting.

#### C) NOMINATIONS

The nominating process mechanism shall be as designated by the Co-Chairs prior to the meeting at which the vote will occur. The Co-Chairs shall provide a minimum of 3 weeks for the nomination process to occur prior to the meeting at which the vote will occur. The Co-Chairs may designate a nominating Subcommittee or seek some other means of organizing and identifying candidates.

#### D) ELIGIBILITY TO VOTE

Voting members shall be restricted to registered INCOSE members. Only voting members shall be eligible to vote on formal issues or matters before the working group. A vote may be taken only when a quorum is present. A quorum shall consist of greater than 20 members of the working group. Proxies may be used to vote and count towards a quorum. Except as otherwise specified herein, all votes shall be by simple majority of voting members present and voting.

#### E) AMENDMENTS TO THE CHARTER AND BYLAWS

Amendments to this Charter, and the Bylaws herein, may be proposed by any working group voting member. Amendments shall be submitted in writing to the Co-Chairs for consideration and voting at the next Annual Meeting of the working group during the International Workshop. Amendments shall be submitted at least 90 days prior to the meeting during which the voting will occur. The Co-Chair shall ensure that the proposed amendments are distributed to the working group membership at least 60 days prior to the meeting during which the voting will occur. Amendments shall be adopted by two-thirds (2/3) vote of working group members present and voting.

#### F) CONFLICTS WITH INCOSE POLICY OR BYLAWS

In the case of a conflict between these Bylaws and the INCOSE Bylaws or INCOSE Policies, the INCOSE Bylaws shall prevail.

## 7 MEASURES OF SUCCESS

Define the overall measures of success for the WG/Initiative.

- A. Promote and develop a community of competent Transportation SE Practitioners
- B. Develop papers to be presented during International Symposia and Workshops
- C. Develop work products facilitating SE practice tailored for Ground Transportation
- D. Maintain interest in SE practice through regular, periodic presentations and meetings
- E. Establish working relations with other professional organizations such as APTA or AREMA
- F. Propagate SE practice throughout disparate stakeholder groups, such as procurement
- G. Support and encourage the entry of student and recently graduated engineers

Coordinate Efforts with educational institutions for research projects and internships

Vision 2025	TWG Objective	Strategy	Metric
Expanding the application of systems engineering across industry domains.	(F) Propagate SE practice throughout disparate stakeholder groups, such as procurement.	Engage with decision makers and influencers throughout the supply chain and beyond.	<ul style="list-style-type: none"> <li>Number of agencies adopting/applying SE.</li> <li>Number of agencies procuring SE services.</li> <li>Number of TWG members from different geographies.</li> <li>Number of TWG members from different supply chain elements.</li> <li>Number of TWG members from different transportation modes.</li> </ul>
Enhancing education and training to grow a SE workforce that meets the increasing demand	(A) Promote and develop a community of competent Transportation SE Practitioners. (G) Support and encourage the entry of student and recently graduated engineers.	Engage with Student Chapters - coordinate with INCOSE chapters to do this. Engage with learning institutions through campus industry events and webinars.	<ul style="list-style-type: none"> <li>Number of active student TWG members.</li> <li>Number of younger System Engineers within transportation.</li> </ul>
None	Provide value to TWG members.	Understand members' needs and provide TWG services, products and events that meet those needs	<ul style="list-style-type: none"> <li>Number of satisfied TWG members</li> <li>Multi-year membership trends and satisfaction trends</li> </ul>
None	Follow a sustainable and resilient approach to all TWG activities.	Avoid over-reliance on individual knowledge.	<ul style="list-style-type: none"> <li>Number of products or events each year</li> <li>Trends over years – events and products delivered</li> </ul>

## 8 RESOURCE REQUIREMENTS

- Shared Document Repository with check-in/checkout functionality to enable shared-concurrent editing capability
- Webinar facilities for meetings
- Website for working group publishing
- Survey capabilities for working group feedback and benchmarking activities
- Branding activities and materials – Printing of TWG Guides, Posters and TWG stickers for use at meetings and events (IW, IS and other organizations or Institutions).
- Facilitation and management of MOU with transportation-related organizations such as APTA, AREMA, UITP.

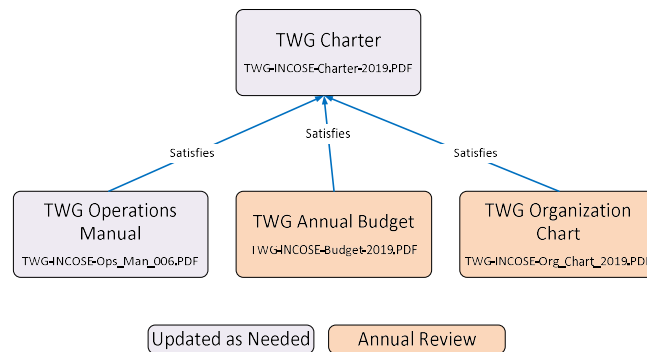
Refer to document [TWG-INCOSE-Budget-yyyy.PDF] for annual budget request details. (yyyy = budget year).

## 9 VALIDITY AND UPDATE CYCLE

This Charter is valid for the period starting 2019. Its content is generally reviewed and updated every three years at the International Workshop (IW).

### 9.1 RELATED DOCUMENTS

This Charter is the highest-level document in the TWG document set. The TWG Charter controls, initiates and informs the TWG Operations Manual, TWG Organization Chart and the TWG Annual Budget:



## 10 APPROVALS

Technical Director, INCOSE

Date

## 11 REVISION HISTORY

Version ID code	Change Authors	Revision Date	Summary of Change
2011	Duncan Kemp, Anne O'Neil	Apr 8, 2011	Founding Version – New Document
0.1	Simon Smith	Feb 16, 2015	Initial draft - re-write of 2011 version
0.2	Nita Rabadia	May 4, 2015	Minor comments added
0.3	Nita Rabadia	Jun 3, 2015	Minor comments added
0.9	Simon Smith	Feb 1, 2016	Updated Annual Plan for 2016
1.0	Simon Smith	May 22, 2016	Released for 2016 following TWG review period
1.1	Simon Smith, Dale Brown	Mar 11, 2017	Updated with Annual Plan for 2017
002 2019	Dale Brown, Denis Simpson	Dec 12, 2019	Re-write for new TechOps template, new mission
003 2020	Dale Brown	Jan 20, 2020	Minor revisions to conform to INCOSE regulations