Agenda

- TORUS Overview
- Iterative Design Process
- GPS Field Research
- TORUS Workflow
- Live TORUS Demonstration
- Summary
- Questions?
○ Feasibility Analysis
○ Planning
○ Safety
○ Initial Layouts and Geometrics
- Approximating ICD location and size
- Evaluating alternative roundabout locations, approach alignments and associated deflection
- Evaluating fastest paths/speeds and speed consistency
- Sight distance calculations
- Reviewing vehicle turning movements/Fluid drive paths
- Enhancing public involvement exhibits
- ROW requirement studies
- Generating preliminary layouts for client review
- Managing and comparing iterations
**Iterative Design Process**

**TYPICAL DESIGN PROCESS**

<table>
<thead>
<tr>
<th>OPERATIONS</th>
<th>GEOMETRIC DESIGN</th>
<th>SAFETY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary Capacity Analysis</td>
<td>Initial Layout</td>
<td>Check Safety Parameters: Fastest Path</td>
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<td></td>
<td></td>
<td>Visibility</td>
</tr>
<tr>
<td>Detailed Performance Analysis</td>
<td>Adjust Geometrics</td>
<td>Design Vehicle Movements</td>
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<td>Review Safety of Revised Geometrics Plan</td>
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Adjust Geometrics
Conducted in conjunction with the Universität der Bundeswehr München, Germany

Study used to develop key TORUS algorithms

Observations were intended to provide data for:

- Variation in vehicle paths vs. ICD
- Speed profiles based on different vehicles
- Acceleration/deceleration values and patterns for different roundabout configurations
- Locations where changes in acceleration/deceleration occur
GPS Field Research

Designing Roundabouts with TORUS

Transoft Solutions
RUN 1

CIRCULATING RADIUS

EXITING RADIUS

INFECTION POINT

CAR 180 15 10

Transoft Solutions
Roundabouts are generated based on vehicle swept path in TORUS. With immediate feedback on the roundabout layout while design vehicles, fastest paths and sight lines are evaluated.
TORUS Workflow

Step 1: Generate/Modify/Analyze

- Set roundabout Design guidelines parameters
- Design Vehicle Movements
- Fastest Paths
- Sight lines
- Generate Reports

Step 2: Fitting Refined Edges (Geometric elements)

- Confirm Fastest Paths on refined edges
- Confirm vehicle movements not supported by TORUS
- Make necessary adjustments to geometrics
Design Guidelines
- Vehicles
- Inscribe Circle
- Circulatory Offsets
- Footprint offset
- Legs
- Bypass Lane Offset
- Splitter Island Envelope
- Refuge / Crosswalk
- Fastest path
- Refined Edges
- Sight Lines
- Generate Roundabout
  - Inscribe Circle Diameter
  - Central Island Diameter
  - Truck Apron

- Toolbox
  - Add Approach legs
  - Delete Legs
  - Edit Legs
  - Replace Leg Reference Geometry
  - Rotate Legs
  - Save Iterations
Designing Roundabouts with TORUS

- Evaluation Tools
  - Evaluate Fastest Path
  - Evaluate Sight Lines
  - Evaluate Movements
  - Run Animation

- Refinement
  - Refine Arcs

- Generate Reports
  - Fastest Path
  - Curve Table
  - Design Manager
  - Design iterations

TORUS Workflow
TORUS is a design tool requiring good engineering practice

TORUS users need to understand its capabilities

TORUS is not a substitute for sound engineering judgment

TORUS users should seek to increase their roundabout design knowledge through training, conferences, workshops etc

TORUS does not eliminate the need for peer reviews early during the design process
Questions? ........

Thank You For Your Time